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No. 142

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PROCEEDINGS OF SECOND PROVINCIAL SCIENCE CONGRESS REPORTED

Xian SHAANXI RIBAO in Chinese 7 Nov 81 p 1

[Article by Correspondent Yong De [3057 1795]: "Second Conference of Provincial and Technical Association Solemnly Opened; Provincial CCP Committee, Provincial People's Congress Standing Committee, Provincial Government, and Provincial Scientific and Technical Association Comrades in Charge, Ma Wenrui [7456 2429 3843], Yu Mingtao [0060 2494 3447], and Zhang Ze [4545 3419] Attend Congress; Comrade Ma Wenrui Makes Major Speech"]

[Text] The Second Conference of the Shaanxi Province Scientific and Technical Association solemnly opened on the afternoon of 6 November in the auditorium of the People's Building in Xian.

This was the grand gathering that Shaanxi Province's scientists and technicians had looked forward to ever since the first Provincial Scientific and Technical Association Congress was held in 1959. An atmosphere of enthusiasm and joyous celebration suffused the conference site, and a horizontal banner carried the words, "Develop Science With One Heart and One Mind, and Contribute Strength to Promotion of Development of the National Economy!" Five hundred seven delegates from learned societies, associations, research groups, and from all prefectures and municipalities in the province attended the conference. Among them were scientists from the older generation with outstanding achievements who had struggled for decades on the front line of science and technology. There were middle age scientific and technical mainstay cadres possessing both ability and political integrity, and there were spirited up and coming young people who were just beginning to make their mark. There were innovators and labor models who had come to the fore through experience in industrial and agricultural production, and there were organizers enthusiastic about the party's scientific and technical endeavors.

The Provincial CCP Committee, the Provincial People's Congress Standing Committee, the Provincial Government and the Provincial Scientific and Technical Association comrades in charge, Ma Wenrui, Yu Mingtao, Zhangze, Chen Yuanfang [7115 0337 2455], He Chenghua [0419 2110 5478], Zhang Ganghai [1728 2455 3189], Lin Yinru [2651 5419 1172], Liu Haidian [0491 3189 3434], Yuan Zhengting [0626 2398 1656], Zhang Hanwu [1728 3352 2976], Dan Weixu [3225 4850 3563], Fan Ming [5400 2494], Fu Daoshen [0265 6670 0135], and Wu Shenxiu [0702 3932 4423] attended the conference. Comrades in charge from units concerned in the Provincial CCP Committee and the Provincial Government also attended the conference.

The delegates to the conference who happily gathered under one roof summarized experiences and discussed the important matter of how the work of the Provincial

Scientific and Technical Association can better serve national economic construction. Since the Third Plenary Session of the 11th Party Central Committee, Shaanxi Provincial Scientific and Technical Association organizations have shown quite a bit of development. Right now 68 associations, societies, and research groups at the provincial level and scientific popularization groups numbering more than 22,000 have been revived or established. During the past 3 years or so, various associations at the provincial level alone have convened more than 590 meetings of various kinds of academic societies, and have exchanged more than 7,750 papers, some of these papers meeting advanced domestic or international standards. In addition more than 10 scientific on-site inspection activities have been held, more than 100 training classes for scientists and technicians have been run, and up to 100 scientific and technical consultations have been given. Scientific and technical associations and societies at all levels have also launched various kinds of activities for the popularization of science. These aforementioned activities have given vigorous impetus to the development of all disciplines and had solved quite a few pratical problems in economic construction. They have played an important role in four modernization construction.

The acting chairman of the Provincial Scientific and Technical Association, Hou Zonglian [0186 1350 3425] conducted the opening ceremonies.

Comrade Ma Wenrui made an important speech at the conference, and extended warm congratulations to the delegates on behalf of the Provincial CCP Committee. In his speech, he emphasized the party's desire that close attention be given scientific and technical undertakings, and he called upon CCP committees and government at all levels throughout the province to place scientific and technical work on their important agenda, and to put science and technology to use so that it truly becomes a tremendous force for increasing economic effectiveness and promoting economic development. All levels of CCP committees should enhance leadership of scientific and technical associations, and make scientific and technical associations mass organizations under their direct leadership like the trade union, the Communist Youth League, the Women's Federation, and the Cultural Federation, giving support to them for actively taking the initiative and being independently responsible for undertaking work. Comrade Ma Wenrui hoped that the broad masses of scientists and technicians would emulate the creative spirit of our great people, would continue and carry forward the glorious tradition of arduous struggle of the Yanan period, would enhance revolutionary vigor, would greatly develop plans for development of science and technology, making more achievements and turning out more people of ability in an heroic struggle to build Shaanxi and realize the four modernizations.

Lan Yuzhong [5663 3022 6988], deputy chairman of the Provincial Scientific and Technical Association attended the opening ceremonies. He said that the main task of this conference was the thoroughgoing implementation of the line, the programs, and policies ensuing from the Third Plenary Session of the 11th Party Central Committee, and the further implementation of the important speech of Comrade Hu Yaobang on behalf of the CCP Central Committee at the "Second Conference" of the Chinese Scientific and Technical Association and the spirit of the "Second Conference" of the Chinese Scientific and Technical Association. There should be further mobilization of the broad masses of scientists and technicians in Shaanxi Province, and closer unity under the leadership of the party to respond to the call of the CCP Central Committee for "development of science for vigorous development of China," carrying forward the spirit of being masters of one's own affairs, working together with one mind, struggling arduously, forming a close bond with the realities of the province's economic construction, broadly developing scientific and technical activities, and struggling to build China into a modern, highly democratic, and highly cultured socialist power.

The Provincial General Trade Union, the Provincial CCP Committee of the Chinese Communist Youth League, the Provincial Women's Federation, the Provincial Social Science Federation, and comrades from the province's military district gave speeches to the conference on behalf of their organizations. They warmly hailed the convening of the second conference of the Provincial Scientific and Technical Association, and wished the conference complete success.

The Conference also received telegrams and letters of congratulations from the scientific and technical associations in the provinces (and regions) of Sichuan, Shanxi, Nei Monggol, Ningxia, Gansu, Xinjiang, and Qinghai.

Today the second conference of the Provincial Scientific and Technical Association will continue sessions, hearing work reports from comrades in charge of the Provincial Scientific and Technical Association.

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MA RUI'S SPEECH TO SHAANXI SCIENCE CONFERENCE

Xian SHAANXI RIBAO in Chinese 7 Nov 81 pp 1, 4

[Article: "Ma Wenrui's Speech to the Second Shaanxi Provincial Scientific and Technical Association Conference (6 November 1981)"]

[Text] Comrades:

The Second Shaanxi Provincial Scientific and Technical Association Conference is a distinguished gathering of scientists and technicians from Shaanxi Province. Without doubt, it holds extremely important significance for the forward advance of socialist modernization in the province. As a representative of the Shaanxi Provincial CCP Committee, I extend hearty congratulations to the conference and offer the assurances of my highest consideration to all delegates and to the scientists and technicians fighting on the frontlines throughout the province.

This conference has been convened under the guiding spirit of the Third Plenary Session of the 11th Party Central Committee. Most comrades attending are scientists and technicians, and quite a few comrades have academic attainments in, or have made contributions to, science and technology. Today, collective wisdom is gathered together under a single roof for joint discussion of the development of science and promotion of the great plan for the four modernizations. We believe that this conference, under the leadership of the party, will give impetus to the further unity, mobilization, and organization of scientific and technical workers throughout the province, and singlemindedly contribute forces for the burgeoning of the province's scientific and technical endeavors and development of the national economy.

At the present time, our motherland has entered an historical period of all around efforts at socialist modernized construction. The Third Plenary Session of the 11th Party Central Committee reaffirmed the political line, the ideological line, and the organizational line of Marxism-Leninism and of Mao Zedong Thought. "Decisions on the Party's Various Historical Problems Since the Founding of the People's Republic" issued by the Sixth Plenary Session of the 11th Party Central Committee completed, for ideological guidance, the task of bringing order out of chaos. Since the Sixth Plenary Session, the CCP Central Committee has emphasized attention to two major matters. One is economic problems; the other is ideological problems. As a result of implementation of the correct line, programs, and policies of the CCP Central Committee, our province's overall situation is very good. As a result of their study of the "Decisions" of the Sixth Plenary Session, the broad masses of party members and the masses of the people in the province have further clarified cardinal questions of right and wrong, have further stabilized unity, and on every front, numerous new advances and new achievements have been made. The work of readjusting the national economy is going forward gradually, and has begun to take the path of steady, healthy development. This year, the summer harvest of grain and oil-bearing crops was a bumper one; light and textile industry development is developing quite rapidly, and the capital construction front, which was for a time overextended, has been shortened. Since the beginning of fall, southern Shaanxi and parts of central Shaanxi have sustained severe flood disasters. In combating the flood and providing disaster relief, the broad masses of party members, cadres, officers and men of the People's Liberation Army, and scientists and technicians have conducted a heroic struggle. They have faced dangers without fear and struggled without regard for their own safety to render contributions to the people, winning the high praise of the people. This shows that we are able to triumph over any adversity, and that we possess an heroic spirit and battle morale that cannot be overwhelmed by hardships. Were it not for the superiority of the socialist system, and were it not for the unity of the party, the government and the armed forces, and their close unity with the people, this could not have been accomplished.

Comrades, it will soon be the end of the year. In looking back on three years of work done since the Third Plenary Session of the 11th Party Central Committee, four modernization construction has not been all smooth sailing. We have both resolutely struggled in the realm of political ideology with erroneous leftist tendencies, and win rightist liberalization tendencies, and we have struggled against drought and flood disasters in the natural world. Naturally, the tasks we have faced have been strenuous, and difficulties have been numerous as well. Some work has not been done the way it should have been. However, it is of importance that the direction in which we are heading has been clarified; the road of construction has been set; and the programs and policies are on the right track. This point is extremely important. The ultimate goal of our revolution is development of productivity. Unless the political line of a party can assure development of society's productivity, what kind of a line is it? Now this problem has been decided. If we simply unite closely around the CCP Central Committee, resolutely carry out the line, the programs, and the policies that have ensued from the Third Plenary Session of the 11th Party Central Committee, have firm confidence, pluck up our courage, and do a solid job through seeking truth in facts, during Shaanxi Province's period of readjustment of industrial and agricultural production, a pace of development that is truly in accordance with realities and that is fairly rapid is definitely possible. Then the political and economic situation in the province can become better and better, and the magnificent goal of modernized construction can be triumphantly realized.

Both numerous speeches given by Central Committee leadership comrades and numerous documents from the CCP Central Committee repeatedly emphasize the need for the entire party to give serious attention to scientific and technical endeavors. In our realization of the four modernizations, the key is the modernization of science and technology. The Sixth Plenary Session's "Decisions" point out: 'It is necessary to resolutely get rid of the completely erroneous notions that have existed for a long time, and that reached their zenith during the "Great Cultural Revolution" that looked down on education, science, and culture, and regarded intellectuals with disdain, and strive to increase the position and the role of education, science and culture in modernized construction, clearly affirming that intellectuals, like workers and peasants, are a force on which socialist endeavors rely. Without culture and intellectuals, it is not possible to build socialism."

Comrades, the Central Committee's "Decisions" have instructed us to "resolutely get rid of" the completely erroneous notions that look down on science and disdain intellectuals. Has our province resolutely gotten rid of them? How many of them has it gotten rid of? Today when we are holding the "second conference" of the Provincial Scientific and Technical Association, we should make an appraisal of this. More than 3 years ago, Comrade Deng Xiaoping in his capacity as representative of the CCP Central Committee to the National Conference on Science and Technology clearly announced that "intellectuals are a part of the proletariat," and that "science and technology is productivity." Afterward, as a result of the party's repeated indoctrination and correction, quite a bit of the erroneous notions of looking down on science and disdaining intellectuals was gotten rid of, and a great change in the situation occurred. But has it been gotten rid of entirely? I do not think one can yet say so. All of us should realize that the existence of this erroneous notion of looking down on science and disdaining intellectuals not only reached its zenith during the period of the "Great Cultural Revolution" under the influence of leftist ideology, but was influenced as well by the ideology of China's long enduring feudal society, and influenced too by the conservative habits and narrow minded view of the petty bourgeois. Some of our comrades, including some of our leading cadres, have been so influenced, regarding science and technology as a "soft task," and believing that it is "not essential," or else being in the habit of "treating it as important in speech, treating it as secondary in action, and pushing it aside when busy." This has not been completely overcome as of the present. In future, the erroneous notion of looking down on science and disdaining intellectuals must continue to be gotten rid of, clearing it entirely from our minds just as one clears away garbage.

Everyone knows that during this new historical period, the central task is to increase economic activities. And what does increasing economic activities depend on? First of all, it depends on the line, programs, and policies, and, second of all, it depends on science and technology. Once the line, programs and policies are on the right track, science and technology take on an even more important role. If one departs from development of science and technology, there is no use talking about economic development or the development of productivity; the two are inseparable. To give attention to industry without giving attention to science and technology cannot be said to give true attention to industry, and to give attention to agriculture without giving attention to science and technology cannot be said to give true attention to agriculture. The CCP Central Committee recently noted that in development of the national economy, one cannot simply rely on the building of new industrial plants, increasing the supply of energy, or increasing the size of the workforce, but rather one must rely on the tapping of unused potential, and concern with economic effectiveness, to expand further production through intension [rather than extension]. To do this, one likewise cannot depart from science and technology. Shaanxi Province is presently fairly well endowed with scientific and technical forces; nevertheless, quite a few economic and technical indeces are in a fairly backward state. There are numerous reasons for this, of course; but one of the main ones is that the province is not making the most of the advantages it possesses in scientific and technical forces.

In addition, in the building of socialist spiritual civilization, the role of science as a spiritual force is also an indispensable major weapon and ingredient. Consequently, CCP committees and government at all levels throughout the province must place scientific and tehcnical work on their important agendas and bring the full role of science and technology into play, so that it can truly become a huge force for increasing economic results and promoting development of the economy. Unless this is done, we are not clear headed economists or clear headed scientists and technicians.

Development of scientific and technical endeavors certainly requires implementation of the programs of scientific and technical work put forward by the party that are necessary to serve economic construction. As a regional scientific and technical association, we should make greater efforts to undertake activities that serve the building of the province's production. Right now, as a result of implementation of the correct policies of the party and implementation of various forms of a system of responsibility in rural villages, the enthusiasm of the peasants for production, and their love for science and enthusiasm for studying, and using science is unprecedentedly high. A mass movement for the popularization of science and technology is building. As a result of readjustment and reform, industrial and mining enterprises have definite authority to make decisions themselves, and an upsurge has occurred in the use of suitable advanced techniques in them. This is a portent and a driving force in the growth and development of our science and technology. We must make promotion of economic development the first task for science and technology, center on production, and strengthen research in production technology, and vigorously spread the use of scientific and technical accomplishments. This must be linked closely to the realities of this province and this region, and in the numerous problems urgently requiring solution that exist in economic readjustment and building of the four modernizations.

We must find problems that affect the overall situation and that are of major significance in development of the economy, and organize forces to tackle them and solve them. Everyone is aware that Shaanxi Province is located in the middle reaches of the Yellow River astride the temperate and semi-tropical zones where sunlight is copious, the layer of soil thick, the climate outstanding, and resources abundant. Central Shaanxi is reputed as "a vast tract of rich soil." According to ancient books on agriculture, northern Shaanxi long ago had abundant pasturelands where "flocks of sheep choked the roads." Southern Shaanxi is richly endowed with conditions for economic diversification. The potential of the province's light and textile industries is very great, and the foundation for machine industries, including national defense industries, is quite solid. These are all advantages that the province possesses. Of course, we also have unfavorable conditions. But just how can we make the most of our advantages, take in hand the major ones, and what major actions should be taken to improve the economy of Shaanxi? These questions pose numerous problems urgently awaiting solution by the province's scientists and technicians. For example:

(1) In Shaanxi Province lie 47 of the 116 counties of the loess highlands that are in the hilly and ravine riven area where errosion is serious. How can scientific techniques for comprehensive control revive the ecological balance so that these kinds of areas can be built into bases for forestry and livestock raising?

(2) Grain production in the 23 counties on the dry plain north of the Wei River has a great bearing on the agriculture of the whole province. What overall treatment can change low yields into consistent increased yields?

(3) How can consistently high yields at reduced cost for grain, cotton, and oil bearing crops be obtained in the central Shaanxi irrigated area and in the Hanzhong Basin?

(4) How can great development be effected for the native specialties, principally of the Qinling and Bashan mountain regions, and for economic diversification throughout the province as a whole?

(5) How dan comprehensive technical research be carried out on the province's energy, water resources, and environmental protection so as to assure economic construction and create prosperity for posterity?

(6) How to make the most of advantages for the province's light and textile industries, using comprehensive scientific and technical research to solve key technical problems, increase color, styles, and varieties, and increase quality of products for new development in the light and textile industries?

(7) How to make the most of the province's advantages for machine industries, using science and technology to tap potential, innovate, and reform to bring forth greater economic benefits?

(8) How to develop new kinds of construction material and other raw and processed material industries so as to improve design and construction of structures in cities and the countryside?

(9) How to prevent and control the province's local illnesses, common illnesses, and frequently occurring illnesses to improve the health of the people?

(10) How to strengthen management of scientific research and to emphasize solution to conspicuous problems in the national economy, and while strengthening research on production technology also properly strengthen research on basic theories and newly emerging sciences?

These problems have an affect on and decide how quickly and how well construction of Shaanxi's economy will be done. We hope that the broad masses of scientists and technicians will think deeply about them and ponder them well, and present practical ideas about them, and that they will make the most of expertise in different fields to solve these major problems, contributing their own intellect and energy. Engels said, "When a society is suddenly confronted with technical needs, these needs give greater impetus to science that 10 universities." ("Selected Works of Marx and Engels" Vol 4 p 505). Will everyone please note that the aforementioned topics are indeed urgent needs of society and major problems of the present that depend on our subjective efforts.

In order better to unite, mobilize, and organize the broad masses of scientists and technicians, the work of scientific and technical associations at all levels in the province must be strengthened. Scientific and technical associations are the bond linking party unity to scientists and technicians. They are assistants, staff officers and advisors to the party and government in scientific and technical work. They have characteristics that transcend trades and industries or departments and they function to laterally relate one scientist and technician to another. These characteristics and functions are such that administrative departments do not possess and cannot substitute for. Since the revival of the Provincial Scientific and Technical Association, much work has been done and achievements made. The Provincial CCP Committee knows that immediately following reactivation of the Provincial Scientific and Technical Association at all levels, numerous difficulties were encountered in their work. As a result, CCP committees at all levels were asked to strengthen leadership of scientific and technical associations, treating scientific and technical associations as a mass organization under their direct leadership as in the case of leadership of trade unions, the Chinese Communist Youth League, the Women's Federation, and the Cultural Federation, and supporting them to actively take the initiative and be independently responsible for undertaking work. The Scientific and Technical Association's authorized strength in special cadres, its expenses, and the location of its office have not yet been decided. Every effort should be made to resolve these matters to create the necessary working conditions for it. All societies within the Scientific and Technical Association should also make the most of advantages for centralization of human talent, for widening academic specialities, and for concentrating knowledge, linking together the scientists and technicians engaged in research, education and in production units, strengthening the relationship between economic departments and production departments, launching wideranging academic exchanges, popularizing scientific and technical knowledge, discovering and training talent, and providing scientific and technical consulting services so that the scientific and technical associations truly perform as scientists and technicians to play a unique role such as other units and mass organizations cannot play.

The discovery, training, and selection for promotion of human talent, particularly of middle age and young scientific and technical talent, is both a matter of lasting importance and one that is urgent at the moment. Human talent creates enterprises and enterprises create human talent. With human talent, enterprises of all kinds can flourish. Shaanxi Province currently has somewhat more than 182,000 scientists and technicians on the job. They possess a strong devotion to China, laboriously toil at research, unceasingly strive to improve themselves, and have made great contributions. They are a principle source of strength and a precious source of knowledge in the building of the four modernizations in Shaanxi Province. CCP committees and government at all levels must diligently implement the party's policies toward intellectuals to fully arouse the enthusiasm and creativity of scientists and technicians. Throughout society must be created a respect for science and a respect for scientists and technicians. Human talent must be treasured; we must keep our eyes pealed for talent; our hearts must love talent; and we should have the courage to use talent to achieve a broadening of talent, with each person being employed to the fullest extent of his talents. It must be understood that the specialty of scientists and technicians is to work in science and technology, and that in order to do their scientific and technical work better, we require them to study politics, Marxism-Leninism, and Mao Zedong Thought so that they will be both red and expert. However, we do not require of them the same standards applied to politicians and theoreticians. Five-sixths of their time should be guaranteed for devotion to scientific and technical work. This political work must, first of all, be undertaken by the party, particularly by persons in positions of responsibility in the party. All of us should be concerned about, look after, and help scientists and technicians, become friends with them, and strengthen our ties with them. All economic, scientific, technical, and educational organization and enterprise or institution should bring into leadership positions those people of talent who combine both knowledge and political integrity, and who understand science and technology. On all matters of economic construction planning, major policy decisions in the national economy, major construction projects, technical reform of enterprises, and formulation of technical policies in the province, the opinions of experts should be sought to avoid making mistakes. All levels of the Scientific and Technical Association should also do good organizational work, and diligently and responsibly promptly transmit the recommendations of scientists and technicians to pertinent party and government units for study and adoption.

Concern for and action on behalf of the welfare of scientists and technicians is a responsibility of scientific and technical organizations that cannot be shirked. On problems of work, study, and living for scientists and technicians, the scientific and technical associations should think of every way possible to solve difficulties capable of being solved. Societies should reflect their needs and requirements, and dare to maintain principles and speak out for them. Cases of unredressed injustices that have as yet been unredressed and made right should continue to be redressed and made right. In case of any attacks upon or oppression of scientists and technicians, or actions that transgress their just rights, intervention should be exercised and struggle carried out. The party has handed to various levels of the party organization and to scientific and technical organizations the duty of routine understanding and supervising implementation of the party's policies on science and technology, and policies pertaining to intellectuals. You must promptly report situations to the party and implement the party's policies.

Comrades, Shaanxi Province is an important cradle of Chinese civilization, and Shaanxi has made surprising contributions to magnificent ancient science and culture. The manufacture of paper, gunpowder, and the compass, which rank among the four great inventions admired in China and abroad, were recorded in earliest times in the histories of Shaanxi. During the arduous years of revolution, it was in Shaanxi that our party built a natural science research organization at Yanan, and Comrade Mao Zedong repeatedly emphasized at Yanan that science is a weapon that man uses against nature to win his freedom. He called for "study of all technical knowledge for the industrialization of China." We should learn from our great national creative spirit, and carry on and carry forward the glorious tradition of arduous struggle of the Yanan period. Following the smashing of the "gang of four," the National Science Conference convened by the Central Committee welcomed the coming of a new springtime in science. The decision by the Third Plenary Session to shift emphasis to socialist modernized construction has opened broad vistas for the proliferation of science. Great opportunities are in view for scientific endeavors. The party reposes great hopes in scientists and technicians, and the people entrust all of you with great responsibilities. It is hoped that comrades will rally their spirits, to develop great plans for development of science and technology, and produce more achievements and more people of talent, and courageously struggle for the construction of Shaanxi and realization of the four modernizations!

May the conference have complete success!

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USE OF LITHIUM NIOBATE MONOCRYSTAL DESCRIBED

Beijing YIQI YU WEILAI [INSTRUMENTATION AND FUTURE] in Chinese, No 2, 1981
pp 3-4

[Article by Shi Zongjian [2457 0022 1017]: "Lithium Niobate Monocrystal"]

> [Text] Editor's Note: On the front page of the RENMIN RIBAO of 22 October 1980, there was a news item reporting that "our nation's man-made lithium niobate monocrystal occupies an advanced international position." It attracted widespread attention of the instrumentation circles. This magazine invited Comrade Shi Zhongjian [2457 0022 1017], assistant researcher of the Acoustics Institute of the Chinese Academy of Sciences, to write this article to introduce to readers the properties and application of the lithium niobate monocrystal.

As long ago as 100 years ago, French scientists, the Curie brothers discovered that natural quartz crystals possessed a strange piezoelectric characteristic. This characteristic is that when applying pressure on a certain substance, the surface of that substance will produce an electrical charge, i.e., the property of producing electricity under pressure. The piezoelectric characteristic is often reversible. It can change mechanical force into electrical energy and it can also change electrical energy into mechanical force. Therefore, materials possessing this kind of piezoelectric transformation were called piezoelectric transducing materials.

As science and technology develop, people have discovered many natural piezoelectric materials in nature, such as quartz and tourmaline. To reduce the cost of piezoelectric materials and improve the physical properties and processing abilities of natural materials, the work of artificial synthesis of piezoelectric materials was launched. In the artificially synthesized materials, the lithium niobate crystal has attracted a lot of attention. Its chemical formula is $LiNbO_3$, abbreviated LN. Its crystal is transparent, it is a type of crystal of the trimorphic system with a 3 m [sic] point lattice group. Its density is 4.7 grams per cubic centimeter. Its hardness is 5 on Moh's hardness scale, its melting point is 1250°C, its Curie point is 1200°C, it is a superior piezoelectric material. The emergence of lithium niobate crystal already has a history of 15 years, and its applications in the realms of acoustics, laser, electronics, computer, nuclear reactors and space flight technology have attracted the people's widespread attention.

Artificial synthesis of the lithium niobate crystal is a relatively complex process. It uses highly pure niobium oxide and lithium carbonate mixed proportionally and mixed thoroughly. The mixture is placed in a platinum crucible, heated until the mixture melts, then slowly cooled to form a solid. Inside are small spontaneous lithium niobate crystals. One of them is taken out as the inoculating crystal (inoculating crystal). When the inoculating crystal comes into contact with a melt, the temperature at the contact point is controlled at near the melting point, then the inoculating crystal is slowly pulled from the melt. At this time, the particles in the melt will form a monocrystal according to the pattern of arrangement of the particles in the inoculating crystal. This process is called pulling of a monocrystal in the profession. The pulling speed is very slow, only several millimeters per hour, and a relatively high technology and a relatively long time are required for the entire pulling process.

The Acoustics Institute of the Chinese Academy of Sciences successfully used a matrix to grow directly a tubular lithium niobate monocrystal. Recently, it grew an extra large crystal ingot of a diameter of 100 millimeters and a height of 50 millimeters.

Material is the basis for developing all types of component parts. The birth and development of the lithium niobate monocrystal enabled the crystal to play its role in the application of various kinds of pioneer technologies. Application practices show it is a kind of electronic material with a bright future.

An important characteristic of the lithium niobate piezoelectric crystal is that it possesses a transducing ability which reaches as high as 70 percent. Thus, it can operate well under rapidly varying forces or electrical signals, even when they change over 100 million times per second. Also, loss is extremely small, and it is a good high frequency piezoelectric crystal. This type of material is suitable for making microphonic devices. There is a type of surface sound wave device used for filtering, oscillation, delay, compression, phase shift and convolution in electronic technology. It is widely used in communications, radar, electronic warfare and color television. Take the medium frequency filter in color television as an example, in the past, it required 5 LC filters and required complex modulation and testing before it could be used. Now, it has been replaced by the lithium niobate acoustic surface wave medium frequency filter. The size is only as large as the fingernail of the little finger. It is small in volume, light in weight, and it does not need further modulation and testing, and it easily matches with integrated circuits. [Figure 1 not reproduced] At present, the production of color television sets throughout the world reaches many million units, the amount of lithium niobate crystals needed is calculated by the ton.

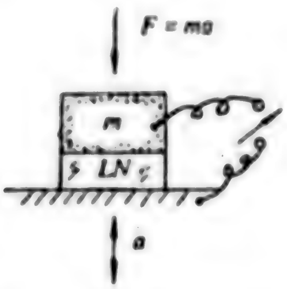

Figure 2. Illustration of the Principle of Oscillation Test

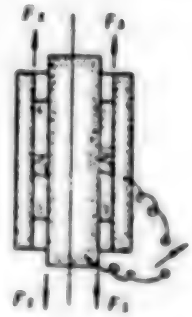

Figure 3. Principle of the Vibration Monitor

The second characteristic of the lithium niobate crystal is that it possesses a good high temperature characteristic. Even up to a high temperature of 1200°C, its piezoelectric properties will not disappear. Under a temperature of 1050°C, it can still effectively function. Below a temperature of 500°C, its transducing ability remains almost unchanged. Therefore, it is also a good high temperature piezoelectric material. In modern technology, many situations require conducting electronic tests under high temperature environments, such as monitoring oscillation in nuclear reactor fuel is an example. At this time, the temperature of the testing environment is as high as 400 to 500 degrees, using lithium niobate piezoelectric crystals is very suitable. A lithium niobate crystal plate can be placed at the part to be tested. A heavy object is then placed on top of the plate. Let the mass be m, then when the part to be tested vibrates, the heavy object on the crystal plate also vibrates, producing a definite acceleration a. According to Newton's second law of motion, the force produced by the heavy object $F=ma$, this force acts upon the piezoelectric crystal plate causing it to produce electrical energy. This is the method of electrical measurement of vibration in a high temperature environment. In addition, various acoustic tests in high temperature tubes and high temperature sounding in deep petroleum wells can also use the lithium niobate crystal.

It also possesses anisotropy like other piezoelectric crystals. This means, the difference in the direction and the form of the forces acting upon the piezoelectric crystals produces different electrical charges on the crystal. According to this principle, at present, vibration monitors with good unidirectionality have been successfully developed. This type of monitor is used in space flight technology and can accurately measure and control the flight attitude of the flying object.

In addition, the lithium niobate crystal also possesses acousto-optical, photoelectric and laser characteristics. As modern science and technology develop, the application of lithium niobate crystals will have a broader future.

9296
CSO: 4008/21

APPLIED SCIENCES

ERGONOMIC RELATIONSHIP ON HANDLES OF MACHINE TOOLS DESCRIBED

Beijing JICHUANG [MACHINE TOOL] in Chinese No 9, 1981 pp 29-30

[Article by Liang Zian [2733 1311 1344] of Hunan University: "Ergonomic Relationship of Handles on Machine Tools"]

[Text] An ideal handle on a machine tool should fit the physiological and psychological characteristics of man so that the operator will feel convenient, comfortable, safe, alert during operation and can operate the machine tool quickly and accurately, the man-machine relationship must be coordinated and the shape of the handle must be esthetic. The following are some personal views on the position, shape and color of machine tool handles.

I. Position of the Machine Tool Handle

Coordination of the ergonomic relationship must be considered from the physiological characteristics of the human body and the structural demands of the machine tool. First, we must understand the physiological characteristics of the hand and the range of movements. The length of the hand of the Chinese male is about 730 mm, that of the female is 680 mm. If the torso does not move, the operating space of the arm is shown in Figure 1.

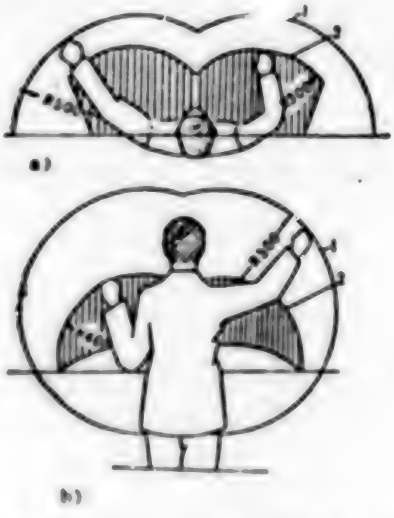

Figure 1. Operating Range of the Arm

Key:
1. Maximum operating range
2. Normal operating range

When the arm bends as shown in Figure 1a (the angle between the upper arm and the forearm is about 120°), the arm is about three-fifths of the original length, the arc drawn by the arm in this position is the range of operation. Figure 1b shows the comfortable operating range of the arm. At this time, the route of motion of the arm is short and comfortable. Handles that are frequently used are better placed at a distance between 150 mm below the shoulders and above the waist. This is because this space is the best space for arm movement. When operating a handle within the scope of normal operations, handles at the above distance can be operated quickly, accurately, the operator does not tire easily and the application of force is good. In the design of machine tools, attention should be paid to place those frequently used handles within the space described above.

When the hand is raised, discomfort will be felt gradually when the fingers are raised above the shoulders. When the hand is raised above the head, more discomfort and more effort are felt. Therefore, certain handles that have to be placed at a relatively high position, such as the gearshift handles on the vertical drilling machine, under ordinary situations, should not be higher than 600 mm above the shoulders of the operator. Certain handles that need to be situated at a lower position, such as the handle of the slide plate box on ordinary lathes should not be lower than the bottom line of the buttocks. Because, to reach something below the bottom line of the buttocks, the person must bend his waist. Operating machinery requiring bending the body, especially when standing, is very tiresome to the body.

The design of the handle of a machine tool must not only consider the comfort of the movement of the hands, it must also consider the characteristics of speed of motion and the application of strength. Experiments have determined the following characteristics of the speed of motion and the application of force:

1. Movement of the hand towards the body is faster than movement away from the body, but the accuracy of the latter movement is higher.

2. When the hand is in a left and right movement, pushing exerts a greater force than pulling. When the hand moves backward and forward, the pulling strength is greater than the pushing strength. The pushing strength is the strongest when the pushing force is at the same height as the shoulders.

3. The hands move faster in vertical motion than in horizontal motion.

4. The hand moves the fastest in "top to bottom" motion and it moves the slowest in "bottom to top" motion.

5. The hand moves quicker in horizontal backward and forward movements than in left and right movements sideways.

6. The right hand moves faster from "right to left" than from "left to right."

7. The speed of a rotating movement of the hands is twice as fast as forward movement.

To adapt to the characteristics of movement of the upper limbs of the human body, the center of rotation of the handle are better at the same height as the elbow because when operating handles in this type of rotating motion, the activity of the upper limbs is mainly accomplished by the forearm circling the elbow in a rotating motion. This position is the most advantageous to utilize fully the operating strength and the operating speed of the upper limbs.

II. The Shape of the Handle of the Machine Tool

The basic requirement of the design of the shape of the handle is that it should make the operator feel reliable and be easy for the operator to apply force, and it should not produce axial slip.

To design an ideal shape of a handle, the physiology of the human hand and palm must be understood. From anatomy we know (see Figure 2), the center of the palm has less muscles and the palm expands into a round shape with a larger diameter. At the base of the thumb and the little finger are two prominences of extensor muscles (the palmaris brevis and the palmaris longus). When the hand makes a fist, the muscles at the base of the fingers contract towards the center of the palm, causing the palm to be filled with extensor muscles. This serves to resist shock and protect the hand. When the hand makes a slight fist, a space in the shape of a waist drum is formed between the fingers and the center of the palm (dotted line in Figure 3). Because the middle finger is longer, the space at the middle finger is the largest. The above analysis can serve as a reference for us to explore the ideal shape of the handle. Practice proves that a handle in the shape illustrated in Figure 4 is more ideal.

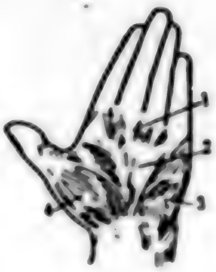

Figure 2. The Muscular Structure of the Hand

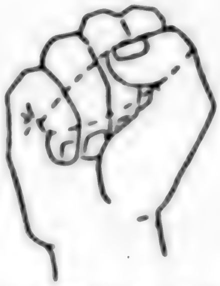

Figure 3. Space Formed When the Hand Makes a Slight Fist

Key:
1. Palmar prominence
2. Center of palm
3. Palmaris brevis
4. Palmaris longus

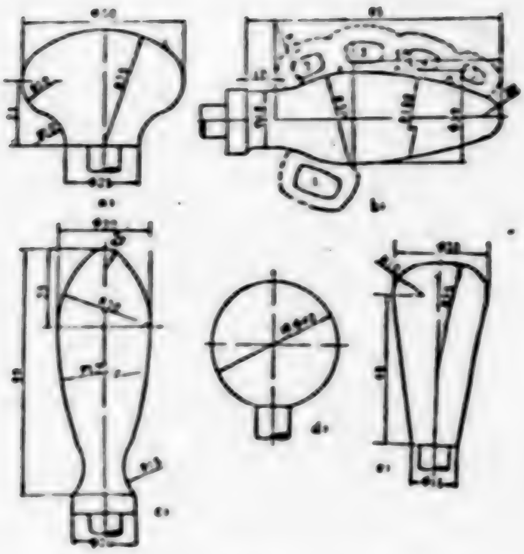

Figure 4. Shapes of Handles

The spherical surface of the handle in Figure 4a can fit into the palm and be surrounded by the fingers. The hand feels comfortable holding the handle and it is easy to apply force. When operating this type of handle, the axial line passes through the center of the palm, and the operating position of the handle changes very little.

The handles shown in Figure 4b are suitable for use when the axial line of the handle is parallel to the face of the palm, the part of the hand between the thumb and the index finger faces the handle in operation. The grip (grip) and the release (release) of the handle by the hand and the application of force are mainly radial. This is because the design of the shape of the handle fits the physiological characteristics of the hand and makes the application of force act evenly upon the handle. We know from Figure 4 that the middle finger is the longest. Besides the thumb, its strength is the greatest. Therefore the maximum diameter of the handle should be at the middle finger. The ring finger and the little finger are shorter, and correspondingly, the diameter of the handle should gradually become shorter. The index finger exerts radial force, it also serves to prevent the hand from slipping axially toward the bottom of the handle. Therefore the curve of the handle from the middle finger to the index finger varies to a greater degree. This type of handle is frequently used in operations where the axial line of the handle is in a horizontal position or when the inclination is relatively small.

The handle illustrated in Figure 4c is suitable for use in operations where the handle is in a vertical position. Because the part between the thumb and the forefinger faces upward when holding the handle, the largest diameter is near the tail end of the handle.

Figure 4d shows a spherical knob. It is suitable for use in operations where the variation of the angle between the axial line of the handle and the horizontal line is larger. The diameter of the sphere of the knob should suit the requirements of the entire shape of the machine tool. It should not be too large, generally the frequently used diameter is 40 mm. The spherical surface diameter of the palm is generally 70 mm. In operation, this handle creates a feeling that the pressure against the hand is concentrated and the middle and the terminal phalanges cannot exert force.

The handle illustrated in Figure 4e is an improvement of the handle illustrated in Figure 4a to facilitate the exertion of force by the fingers and to satisfy the demands in appearance.

It has an added conical part. The handle of this shape is suitable when the axial line of the handle passes through the center of the palm and when the positional variation of the handle is about 45°, and it is gradually being used on modern machine tools.

9296
CSO: 4008/14

APPLIED SCIENCES

DEVELOPMENT OF MEDIUM-SIZED TRUCKS IN CHINA DISCUSSED

Changchun QICHE JISHU (AUTOMOBILE TECHNOLOGY) in Chinese No 9, 1981 pp 60-61

[Article by Yan Ji [0917 2623] of the Automobile Society: "Several Views on the Development of Medium-sized Trucks in Our Nation"]

[Text] After reading the article entitled "The Selection of Engine Power of the Medium-sized Trucks" published in the No 2, 1981 issue of your magazine, I have several views concerning the development of medium-sized trucks in our nation, which follow:

The design of our nation's automobiles is one basic model, while our nation is a nation with mountain regions and with a broad area of plateaus. The changes in roads and conditions of use are especially varied. The highest elevation of highways in the Yunnan mountain regions can reach a maximum of 20 percent. The variation in the conditions of use also is large. For example, the transportation units use mostly trailers. The Liberation model truck has a gross weight of 8 tons, and it is frequently used to tow trailers weighing a gross of 5 to 6 tons. Yet, the vehicles of some agencies and business units do not tow trailers and frequently run without carrying a full load. Therefore, a single model cannot satisfy all the needs, and the design concepts must change. One basic model should have several to a dozen variations before it can realize the goal of conserving energy and reducing the cost of utilization.

My opinion is: to conserve energy, medium-sized trucks should run on diesel fuel. Diesel engines can use the dry cylinder cap with a large diameter, compression, compression cooled methods to increase output power. The range of increase of output power can reach 60 percent to 100 percent or higher. Now, experimental research in heat insulation of the combustion chamber of the diesel engine is being carried out, and pistons with ceramic tops have already been used. The exhaust temperature has been raised from 500° C to over 700° C, increasing the energy of the exhaust, and the surplus energy can be transmitted via the exhaust turbine to the crankshaft for output, forming a combined engine. This type of engine not only has a high lift power; its fuel consumption also is low. It may be able to reach below 145 grams/horsepower.hour.

I Suggest Vehicles With the Following Variations:

1. Basic model: This model is for transportation units that will use the vehicles in the plains below 500 meters above sea level. The vehicle can use a

six-cylinder dry cylinder cap as the basic model engine. The towing weight can be 50 percent to 70 percent the gross weight of the vehicle. The power per ton of gross weight of the trailer car can be 8 to 10 horsepower;

2. Variation of an engine with reduced power: This vehicle is for agencies and units that will use the vehicle in the same regions described above. The vehicle can use a six-cylinder wet or dry cylinder cap engine. The power per ton of gross weight of the trailer car can be 8 to 10 horsepower or slightly larger;

3. Variation of the engine with increased power: Used by units for ordinary mountain regions with a maximum slope of 6 percent to 7 percent and an average slope of 2 percent to 4 percent. The vehicle can use a six-cylinder dry cylinder cap engine or a wet cylinder cap engine for compression, the compression ratio is 1.5, and the output power can be increased to about 25 percent. The towing weight can be 50 percent of the gross weight of the vehicle. The power per ton of gross weight of the trailer car can be 12 to 14 horsepower;

4. Variation for maximum power: This vehicle can use the dry cylinder cap compression-cooled engine. The total towing weight can be 50 percent of the gross weight of the vehicle. The power per ton of gross weight of the trailer car can be 14 to 16 horsepower;

5. Variation for use in the Qinghai-Xizang Plateau: This vehicle is used in regions at an elevation of 3,000 to 5,000 meters above sea level. The vehicle can use a six-cylinder dry or wet cylinder cap high-compression engine, the compression pressure ratio is about 2.5, and the power per ton of gross weight of the car or trailer must not be less than 8 horsepower.

Take the medium-sized truck with a gross weight of 10 tons as an example, if the basic model diesel engine is a six-cylinder ϕ 100 x 110 engine with a wet cylinder cap, an exhause of 5.18 liters, a lifting power of 22, then the power will be 114 horsepower, the rate of revolution will be 2800 revolutions/minute, the torque at standard power is 29.2 jin.meter, maximum torque is 1.1 x 29.2 = 32.1 jin.meter, average effective pressure of maximum braking is 7.79 jin/centimeter, suitable for plains without towing.

If the dry cylinder cap is ϕ 110 x 120, exhaust is 6.37 liters; and, if the standard speed of revolution is still 2800 revolutions/minute, the power will be 140 horsepower, suitable for plains and towing.

The power of the dry cylinder cap simple compression diesel engine can reach 180 horsepower, suitable for ordinary mountain regions and towing.

The dry cylinder compression-cooled diesel engine can reach 210 to 230 horsepower with a compression pressure ratio of 2, suitable for use in the Yunnan-Guizhou Plateau and mountain regions and towing.

If the engine combining piston and heat insulation is developed, its power can hopefully reach 280 to 300 horsepower, and the useful range will be even greater.

The diesel engine with a dry cylinder cap compression-cooled pressure ratio of 2.5 can produce a power reaching over 140 horsepower when used in the plateau at 5,000 meters above sea level, suitable for the Qinghai-Xizang Plateau and towing

According to the cases described above, a series of vehicle modesl needs a series of engines, one type of front axle, steering gear, brake, another type of rear axle casing. The main transmission gear for each type is different. The basic model and the reduced-power model use single-gear deceleration, the added power model uses single-gear deceleration as the main transmission with disc brakes. The transmission system for each type is different, but it should be designed as a series, and the casing can be produced on one automated production line. For example, the basic model of the transmission can be a five-speed with the fifth shift serving as a direct shift transmission. The added power model can use the eight-speed and a main transmission of four shifts with a low-speed ratio secondary transmission. The maximum power model can use an eight-speed main transmission of four shifts with a high-speed ratio secondary transmission. The transmission casing of the two types of secondary transmission is different, the number produced is small, and the flexible manufacturing system can be used for processing. The other parts and the body of the vehicles are all the same. The chasis should have three to four variations in the wheelbase. The brake system should provide a choice of fluid pressure (towing) or vacuum booster hydraulic brake system (not towing).

The above actual examples and figures are not necessarily correct, but the design concepts of trucks (especially medium size and heavy trucks) should be thus. Only in this way can we meet the demands for many different uses, can we realize the goal of conserving energy and reducing the cost of use. The method of using unchanged ways to meet all changes is wrong. It is estimated that, after several years, the automobile industry will face competition, and only by diversified products can sales be expanded; a single produce line may not sell.

The organization of the plants also will change, the products that cannot be produced on one production line or be processed on the automated line can be provided by specialized plants, and in that way, products will be more varied.

9296
CSO: 4008/16

APPLIED SCIENCES

COMPUTERIZED MANAGEMENT OF ENTERPRISES UNDERWAY

Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 21, 5 Nov 81 p 8

[Article by the Computer Station of the Cold Rolling Plant: "Wuhan Steel Mill's Cold Rolling Plant Begins to Use the Computer for Business Management"]

[Text] The Wuhan Steel Company's Cold Rolling Sheet Plant is a cold rolling plant equipped with equipment introduced from West Germany. It is technically at an advanced level of the 1970's. Five machines for cold continuous rolling utilize the computer for automatic controlled production. The traditional manual management (i.e., manually writing and copying reports) cannot adapt to the needs of modernized production anymore. For this, the plant began in 1980 to use the computer in business management. At present, computer management of the production plans for the major production lines of acid washing, steel rolling and zinc plating and salary payments by computer have been completed.

The plant uses production planning management as the main line. Based on contract demands, a production tracer card has been set up for each machinery unit's technological flow chart, data and information. Then, the data of each machinery unit are punched onto punch cards of 80 rows. The computer analyzes and processes the contents of these cards according to the management program for each machinery unit, and outputs all types of production plan reports according to different needs. They established a small Chinese character processing system that can print out Chinese reports.

In production management, the first thing is the processing of massive amounts of data and information. In actual production, one must also consider the recording and revision of production parameters. Therefore, how to store and manage data is a very important question. The computer used by that plant is the DIETZ 621 computer imported from West Germany. It is a small general purpose computer with an 8-digit/byte based, variable word length, real time multiple program operating system and changeable magnetic discs. According to the characteristics of this machine, they used disc document management to process data. Storage and revision of data can be conveniently processed by the disc document management commands in the program.

The production management program is written in BASEX (extended BASIC). It has a dozen or so functions, such as card reading, data limits checking, revision of data, insertion, copying and clearing functions. Because the program is long, sectional programs are used and processing utilizes masked areas. The entire program consists of a basic program with a dozen sectional programs. During execution of the program, the basic program is permanently stored while each sectional program is accessed by the program. The program has a strong man-machine conversational capability, operation is convenient, compilation is versatile, and it is easily expandable.

After the plant utilized the computer in management, it strengthened the scientific nature of management, improved work efficiency, reduced errors, and obtained good economic results. Taking the management of the acid washing plan as an example, by reducing the error rate by one percent, and calculating at the present production rate, this year, it can increase production and conserve about one million yuan.

At present, the plant is exerting continuous efforts to establish an independent computerized management system and to link with the on line control computer for parallel operation, forming a closed loop system. Because of computerized management, the production plans, contract plans and delivery of products of all of the machinery units of the whole plant have been balanced, and through the transmission of information between the on line control computer and the production site, there is feedback and the execution of the production plan can be monitored. At the same time, the control computer is linked with the computer of the management center of the company to reflect production activities to the company in time. In addition, the daily tasks of the whole plant, including finances, warehousing and information, and personnel files are all being managed.

9296
CSO: 4008/31

NEW APPLICATIONS OF INFRARED TECHNOLOGY DESCRIBED

Beijing GUANGMING RIBAO in Chinese 10 Nov 81 p 1

[Article by Song Guangli [1345 1639 4409] and Hu Youquan [5170 2589 3123]: "Beijing Region Opened Exhibition Session on Application of Infrared Technology"]

[Text] Beijing region promotion exhibition of infrared technology application, jointly sponsored by China Electronics Society and Beijing Optics Society, has recently opened its session in the capital.

This exhibition included infrared technology research results and products from 29 scientific research, production and application units (including Beijing region and some units of the Fourth Ministry of Machine Building outside Beijing). The exhibited items, 250 in all, were grouped into 7 categories: elements and components in infrared technology, infrared spectral analysis, infrared remote sensing, infrared analysis, infrared imaging, infrared temperature measurement and infrared tracking. The items displayed are already being used in defense, metallurgy, electric power, communication, agriculture and forestry, energy conservation, petroleum chemistry, light industry and textile industry, environmental protection and medical and sanitation departments. Some of the items are of quite high standard; for example: the high speed scanning infrared thermograph developed by North China Institute of Optical and Electrical Technology features fast display, clear image and high resolution. It can be used for night time observation, checking thermal energy leaks, in medical diagnosis, temperature field monitoring and document discernment. The medical thermograph developed by North China Optical Instrument Plant may be used in the diagnosis of mammary gland cancer and angitis. The infrared dichromatic thermometer developed by Shenyang Optical Instrument Plant, Shashi Optical Instrument Plant, and North China Institute of Optical and Electrical Technology is characterized by its high speed and the contact-less nature in measuring a body's temperature and is suitable for application in metallurgical smelting, hot work of metal, semiconductor technology and automated control. Beijing Analytical Equipment Plant developed several models of gas analyzers that are important for production safety and environmental protection. The microwave acupuncture apparatus developed by North China Institute of Optical Electrical Technology invoked great interests in the audience. This machine combined the technology of microwave physical therapy with traditional Chinese acupuncture techniques and became a new tool for acupuncture. Tests showed that it is clearly effective in the treatment of coronary disease, angina pectoris, neuroparalysis and arthritis.

In this exhibition, there were not only written and graphical display and demonstration of actual products, purchase orders can be taken on the spot as well. The exhibition facilitated the promotion and popularization of infrared technology products.

9698
CSO: 4008/27

FIRST OPTICAL FIBER COMMUNICATIONS LINE FOR CHINA'S ELECTRIC POWER SYSTEM

Beijing GUANGMING RIBAO in Chinese 6 Dec 81 p 2

[Text] The Nanjing Automation Institute of the Ministry of Electric Power Industry in coordination with the Nanjing Electric Power Supply Bureau has set up the first optical fiber communications link in our country's electric power system. Extending from the Nanjing Electric Power Supply Bureau to the Chaotian Gong Transformer Station, this 3.2 kilometer-long line is an important technical achievement for the future application of optical fiber communications in our country's power industry.

Since setting up the 3.2 kilometer optical fiber communications system, it has already undergone intense winter cold and summer heat tests. Since beginning continuous operation in January of this year, it has reliably transmitted dispatcher phone calls, closed circuit industrial TV, and moving signals. Industrial TV and electrical carrier wave requirements were met for all major technical specifications. Audio clarity, image resolution, precision of motion information transmission, and operational dependability were excellent. Originally most industry TV did not transmit images over 1 kilometer, but now images can be sent 3.2 kilometers. In the simultaneous transmission of 12 telephone messages, the sound is as clear as in face-to-face conversation. Efficiency is also very good for dispatchers using optical fiber communications systems to transmit dispatching orders and carry out remote sensing, communications [7193 0207], and control.

CSO: 4008/45

BRIEFS

SHANDONG TRANSMISSION DEVICE--The provincial post and telecommunications bureau recently held a meeting in Qingdao to evaluate China's first atmospheric carbon dioxide laser transmission device [da qi chuan shu er yang hua tan ji guang tong xin gui] which was designed by the Qingdao post and telecommunications bureau and was installed between Qingdao and (Huang Dao) in November of 1980. The meeting proved that the device is up to standards and able to withstand all kinds of weather. [Jinan Shandong Provincial Service in Mandarin 2300 GMT 11 Dec 81 SK]

NEW SHANGHAI TELEVISION JOURNAL--Sponsored and published by the Shanghai municipal television station, the SHANGHAI TELEVISION JOURNAL will come off the press in January 1982. Aside from carrying reports, comments and program previews of the Shanghai television station, the new journal will also introduce programs to be relayed by the Shanghai station and development of television enterprises in other parts of China. The journal will be published bimonthly, and the price of each issue is 0.20 yuan. [Shanghai City Service in Mandarin 2300 GMT 10 Dec 81 OW]

JIANGXI BROADCAST REMOTE CONTROL--Shicheng County, Jiangxi, developed a digital wire broadcast remote control and remote check device. With the device, the county wire broadcast station exercises remote control and remote check of three commune wire broadcast stations so that they no longer need to be manned by duty personnel. [Nanchang Jiangxi Provincial Service in Mandarin 1100 GMT 30 Nov 81 OW]

NEW MICROWAVE LINE--At the request of television viewers, a JILIN RIBAO reporter visited the provincial post and telecommunications administrative bureau and the provincial broadcasting bureau. Responsible comrades and personnel at these two bureaus discussed construction of the microwave line installation project and television program reception. The function of this microwave line is to relay the programs of the central television station. Construction began this April. Because this microwave line is long, the installation work is arduous and many new problems have cropped up, this project will take a long time to complete. The installation of the microwave line, which links four provinces and one municipality, is contracted by the second engineering company under the Post and Telecommunications Ministry. The installation work on main parts of this microwave line has been virtually completed. Many special targets have been fulfilled. To enable television viewers to receive better reception of the central television station, the workers are trying to wrap up their tasks as soon as possible. It is estimated that this project will be completed by the end of December and will be put into operation on 1 January 1982. [Text] [SK080930 Changchun Jilin Provincial Service in Mandarin 1100 GMT 6 Dec 81]

LASER TECHNOLOGY ADVANCES--Output power stabilizers for argon ion lasers and helium-neon lasers developed by the optics laboratory of the Chinese Institute of Measurement Science have recently passed certification. Laser lights are emitted from lasers and the quality of a laser has a direct bearing on the scope of application and efficiency of a laser. Instability in output power is one of the major problems existing in lasers today. In order to solve this difficult problem, scientists in the optics laboratory of the Chinese Institute of Measurement Science have for the first time in China succeeded in developing output power stabilizers for argon ion lasers and helium-neon lasers using the magneto-optical principle. These devices have improved the stability of argon ion lasers by a factor of 100 and helium-neon lasers by a factor of 30, and both reached the advanced standard in China. [Text] [Beijing GUANGMING RIBAO in Chinese 9 Nov 81 p 1]

LASER MICROBEAM--Beijing, 2 Dec (XINHUA)--China's first argon ion laser microbeam, used for operation on cells, is now being applied to dissect cell nucleus in the Institute of Genetics [words indistinct] Chinese Academy of Sciences after a national appraisal. The laser microbeam was developed by the institute in cooperation with Beijing Teachers' College and Beijing Engineering Institute starting 1979. The appraisal proves that the major parts are up to advanced standards. [Text] [Beijing XINHUA in English 0217 GMT 2 Dec 81 OW]

U.S. ELECTRONIC PRODUCTS CATALOGUES--Beijing, 16 Dec (XINHUA)--The first electronic products and instrumentation literature exhibition of the United States opened Tuesday in Beijing. The 6-day exhibition is sponsored jointly by the China translation and printing services of the United States, the China Council for the Promotion of International Trade and the China Electronics Import and Export Corporation. On display are over 200 catalogues on semiconductors, microwave technology, communications, computers, broadcasting and television systems, avionics and domestic electrical appliance products. These catalogues are provided by more than 60 U.S. companies. Sun Fang, vice-chairman of the China Council for the Promotion of International Trade, cut the ribbon at the opening of the exhibition. The exhibition will be in Nanjing from 19 to 25 December and in Chengdu from 23 to 29 December. [Beijing XINHUA in English 1219 GMT 16 Dec 81 OW]

CSO: 4020/54

HIGH ENERGY PHYSICS INSTITUTE PERSONNEL DETECT RADIATION IN HUMAN BODY

Beijing DIANZI SHIJIE [ELECTRONIC WORLD] in Chinese, No 7, 1981, p 6

[Article by staff correspondent: "Scientific Research Personnel of the High Energy Physics Institute of the Chinese Academy of Sciences Detect a Kind of Radiation in the Human Body"]

[Text] Since the SICHUAN RIBAO and "NATURE MAGAZINE" reported on the extraordinary functions of the human body in 1979, scientific research personnel of the High Energy Physics Institute of the Academy of Sciences, Xu Hongzhang [1776 7703 4545], Zhao Yongjie [6392 3057 3954] and Shen Jing [3088 4842] conducted an experimental study of the problem concerning whether radiation is produced by extraordinary visual processes and the process of generating inner strength in the human body through gigong, a Chinese marshal art exercise. They discovered that X-ray film, nuclear emulsion film and other photographic negatives placed in various types of sealed containers that are not penetrable by light can be photographically sensitized by a definite probability and produce other extraordinary signs. Similarily, dosage reactions higher than the natural background by several dozen times can also be produced on heat releasing light dosage recording plates. During the course of tests of identification of objects by persons with extraordinary vision, a kind of biological detector used can also receive very strong related signals. This type of detector utilizes the leaves of certain plants. Microelectrodes are placed on the vines of leaves. Then, an amplifier and a recorder are attached. Recently, in the quantum counting system, we measured radiation obviously produced during the course of extraordinary vision. This type of radiation comes in bursts in an indefinite cycle. The width of a single radiation does not surpass the magnitude of seconds. Instantaneous intensity is at least several hundred to several thousand times the natural background. That quantum counting system consists of four electronic instruments of nuclear medicine manufactured by the Sichuan Jianan Instruments Plant, insert components of nuclear electronics manufactured by the Beijing General Instruments Plant and the 512 channel pulse amplitude analyzer with electronic components of the West German high energy spectrograph and the oscilloscope manufactured by the Dekequalangnikesi [phonetic] company of the United States (a detailed report of the above experiment was published in "Electronic Science and Technology").

We used the above methods and systems to carry out experimental study of ordinary persons and persons skilled in gigong marshal art exercises and obtained some results. We discovered that when ordinary persons practice gigong exercises, they also produce radiation. But the signals and the duration are different from the extraordinary visual process, and the delay process is much slower.

These experimental results, by mutual contrast from different angles provide evidence showing that unknown radiation is present in the human body. This type of radiation may give us rich information and can show many strange functions. It is a subject worth exploration in physics, electronics, information theory, cybernetics and other scientific disciplines. This work has received much support from the leadership at each level and the enthusiastic masses. Many scientists and experienced experimental physics workers such as Zhao Zhongyao [6392 1813 1031], Tang Xiaowe [0781 1321 1218], Xu Jianming [1776 1696 6900], Fang Cheng [2455 3397] and Zheng Zhipeng [6774 1807 7720] have participated in the experiments many times.

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CSO: 4008/20

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9717
CSO: 4008/43

AUTHOR: ZHANG Jiajun [1728 1367 7486]
HE Jianyu [0149 1696 3768]
JIANG Dongliang [5592 2767 4731]

ORG: All of the Institute of Atomic Energy, Chinese Academy of Sciences, Beijing

TITLE: "The Role of Ferrous Sulfamate as Reductant in Valancy Adjustment of Highly Enriched Uranium Feed Solution"

SOURCE: Beijing HE HUAXUE YU FANGSHE HUAXUE [JOURNAL OF NUCLEAR AND RADIOCHEMISTRY] in Chinese Vol 3 No 4, Nov 81 pp 227-233

TEXT OF ENGLISH ABSTRACT: In the study of the interaction of Fe^{2+}, SA with HNO_2, H_2O_2 and HNO_3, it was found that SA is effective in preventing oxidizing action of HNO_2, but not of radiolytically formed H_2O_2 on Fe^{2+}. SA could not protect Fe^{2+} from direct oxidation by HNO_3. The quantity of SA required to stabilize Fe^{2+} in HNO_3 solution depends on the latter's concentration. The valency change of Pu in 1.5 *M* HNO_3 - 1.5 *M* Al $(NO_3)_3$ solution depends on [Fe^{3+}]/[Fe^{2+}] value.

The potential measurement of a solution containing 1.5 *M* HNO_3 - 1.5 *M* Al $(NO_3)_3$ was accomplished. The formal potential of Fe^{3+}-Fe^{2+} couple in the above-mentioned solution is about 777 mV vs SHE. An anomalous potential jump of Fe^{3+}-Fe^{2+} couple

[Continuation of HE HUAXUE YU FANGSHE HUAXUE Vol 3 No 4, Nov 81 pp 227-233]

was observed when the [Fe^{3+}]/[Fe^{2+}] value is relatively high. The occurrence of anomalous potential jump depends on [Fe^{3+}]/[Fe^{2+}] value and surface condition of the Pt electrode. The [Fe^{3+}]/[Fe^{2+}] value can be calculated over a wide range by measuring the Redox potential in the solution which is, in turn, used for estimating the change in Pu valency.

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MA Huifang [7456 1920 5364]
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ORG: All of the Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou

TITLE: "A Search for Superheavy Elements in Nature"

SOURCE: Beijing HE HUAXUE YU FANGSHE HUAXUE [JOURNAL OF NUCLEAR AND RADIO-CHEMISTRY] in Chinese Vol 3 No 4, Nov 81 pp 247-250

TEXT OF ENGLISH ABSTRACT: The results of a search for elements 109 and 110 in nature are reported. No significant activity was observed in the sample by solid track measurements, but an excess α-activity exists in the 4.3 - 4.6 MeV region as shown by the α-pulse-height spectrum of the nickel anode mud sample. Assuming a halflife of 10^8 years for the superheavy elements concerned, the upper limits of the concentration of elements 109 and 110 are estimated at 10^{-13} and 10^{-11} grams per gram of sample respectively.

9717
CSO: 4009/167

AUTHOR: PANG Xiuzhen [1690 4423 3791]
HU Zongzao [5170 1350 5679]

ORG: None

TITLE: "Highly Parallel Data Flow Computers"

SOURCE: Chongqing JISUANJI KEXUE [COMPUTER SCIENCE] in Chinese No 5, 23 Oct 81 pp 1-12

ABSTRACT: As computer usage has advanced from numerical computation, data processing and production control into a wide range of non-numerical applications, such as text processing, conversation and image processing, etc., computers are undergoing rapid development. This paper introduces highly parallel data flow computers which can handle non-numerical applications with a high degree of effectiveness and can also handle distributed numerical processing. The problem of sacrificing generality of programming is discussed, along with the contrast with the traditional von Neumann machine which serially processes one word at a time. Examples of highly parallel machines are introduced, such as the loosely-coupled parallel muiti-processor developed by J. Patil. There is no mention of such machines made or being made in China.

AUTHOR: CAI Jingqiu [5591 4842 3808]

ORG: Software Teaching and Research Office, Department of Mathematics, Xiamen University

TITLE: "Recursive Programming and Its Verfification and Synthesis Techniques"

SOURCE: Chongqing JISUANJI KEXUE [COMPUTER SCIENCE] in Chinese No 5, 23 Oct 81 pp 40-54

ABSTRACT: In program design the most commonly used method of controlling an iterative computation is to set up a program loop. Recursive programming is another technique. It is a kind of loop structure which can make a highly complicated computation quite simple. ALGOL-60 and LISP incorporate recursive structures, which enable a sub-program to call itself. Various examples of recursive programming are given. The principles of recursive computation are analyzed. The verification and synthesis of recursive programming are discussed. The structural induction method is compared to mathematical induction and its application to the verification of recursive programming is considered.

6168
CSO: 4009/127

AUTHOR: LI Guojie [2621 0948 2638]

ORG: China University of Science and Technology

TITLE: "A Few Type of System Structure--Data Flow Computers"

SOURCE: Beijing DIANZI JISUANJI DONGTAI [COMPUTER REVIEW] in Chinese Vol 18 No 11, Nov 81 pp 1-8

ABSTRACT: Since the beginning of computers the von Neumann machine has occupied the ruling position. Designed on the basis of the control flow concept, it is controlled by instructions. It has problems with parallel processing. Several new types of computers use parallel technology but they have not abandoned the control flow design principle, however. The data flow computer represents a major advance, which dispenses with the program unit and adopts asynchronous control. This paper describes the tabular data flow language and the method of encoding this language for implementation in the hardware. The implementation of the system structure of the data flow computer is described in terms of 5 major components: the memory, the processing unit, the arbitration net, the distribution net, and the control net. The design concept of uniting data flow and control flow is explained in terms of the JUMBO computer designed by Newcastle University.
This paper was received for publication in Jul 80.

AUTHOR: YANG Shiren [2799 0013 0088]

ORG: Research Institute of Remote Sensing, Chinese Academy of Sciences

TITLE: "The Computer Processing of Remotely Sensed Images and Its Development: (III) Magnetic Tape Formats for the Recording of Image Data"

SOURCE: Beijing DIANZI JISUANJI DONGTAI [COMPUTER REVIEW] in Chinese Vol 18 No 11, Nov 81 pp 37-47

ABSTRACT: In image processing by computer the volume of data is very large and it is often recorded on magnetic tape. The format for arranging this data, especially for multispectral images, has a great impact on the efficiency of computer analysis. Remote image data is often obtained from multispectral scanners (MSS), return-beam vidicons (RBV), and synthetic aperture radar (SAR.) These data can be digitized with a scanner digitizer. An image element might consist of 64 to 256 gray levels, represented by one character. An MSS image from LANDSAT consists of about 2340 scan lines, each line being composed of about 3240 elements. LANDSAT MSS data uses 9-track half-inch tape, with data recorded at 500,800, and 1600 BPI (bits per inch) in ANSI code. This paper discusses these formats for recording image data on magnetic tape and their effects on the efficiency of processing. They all follow the IBM or ANSI 1973 a,b standard. An understanding of their structure and content will allow them to be applied on any computer. The selection of suitable formats is vital to efficient processing.
This paper was received for publication in Jan 81.
6168
CSO: 4009/147

AUTHOR: LIU Xiankun [0491 2009 0981]

ORG: None

TITLE: "Theory and Circuits of Cassette Magnetic Audio Recorders: III. Automatic Level Control Circuit"

SOURCE: Beijing DIANZI SHIJIE [ELECTRONIC WORLD] in Chinese No 9, Sep 81 pp 16-17, 21

ABSTRACT: The automatic level control (ALC) circuit is used to prevent overload distortion. As most cassette recorders are portable, the size is generally small and the voltage low, with a highest magnetic recording level of about 55 dB. Most of the music to be recorded varies above 80 dB, however. If the recorder is to be capable of recording the weakest sound without being drowned by the noise of the magnetic tape, the strong signals will necessarily cause the circuit and the magnetic tape to be saturated to create distortion. ALC is the commonly used circuit to contract those strong signals that exceed the range of the circuit and the magnetic tape of the recorder. This paper compares the similarities and differences of the ALC circuit of a cassette recorder with the AGC [automatic gain control] circuit of radio and television receivers, discusses the range of effective control of ALC, and introduces several common ALC circuits.

6168
CSO: 4009/162

AUTHOR: ZHENG Liangyong [6774 5328 3057]
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TITLE: "Applications of Tungsten and Molybdenum Materials in the Electronic Industry"

SOURCE: Shanghai DIANZI JISHU [ELECTRONIC TECHNOLOGY] in Chinese No 10, 20 Oct 81 pp 4-6

ABSTRACT: Tungsten and molybdenum are metals very difficult to melt. Since the first attempt of using tungsten filament as a high temperature material in 1909, the technology of using hard to melt metals has progressed so much that they have become indispensable in electronics, nuclear energy, and space travel sciences. While discussing progress in the use of tungsten and its alloys in vacuum devices, the paper mentions the successful attempt by Chinese scientists in 1971-72 to use the non-radioactive cerium in the place of thorium to produce cerium-tungsten filament. The radiation damage to the workers and the environmental radiation pollution in the process of making thorium-tungsten filament have thus been eliminated. Other new accomplishments of Chinese researchers mentioned include super-fine tungsten filaments, plasma spraying, high pressure hydrogen reduction technique of making low valence molybdenum oxide, wet hydrogen reduction method of improving the extension rate of fine molybdenum filaments, improving the property of molybdenum filament by adding cobalt and magnesium, new process of applying ultrasonic wave to cold pulling of tungsten filaments, and new uses of tungsten-molybdenum and their alloys in vacuum devices.

AUTHOR: IAO Chengxin [0525 6134 0207]

ORG: None

TITLE: "The DJS-054 Microcomputer"

SOURCE: Shanghai DIANZI JISHU [ELECTRONIC TECHNOLOGY] in Chinese No 10, 20 Oct 81 p 43

ABSTRACT: Most recently, the Shanghai Electronic Computer Plant has begun to produce the DJS-054 microcomputer system. It is composed of large scale integrated circuits with the Intel8080A CPU as the nucleus. It has 8-digit character length and 78 basic instructions, and 64K maximum storage capacity. Its external accessories include a soft magnetic disk device, cassette tape machine, character display device, control typewriter, fast hole puncher, etc. The microcomputer is suitable for real time control, business and industrial management, instruments and meters, intelligence terminals, teaching and laboratory uses. In larger application systems, it may also be used to form multi-stage control and multi-machine systems.

6168
CSO: 4009/130

AUTHOR: CHEN Zhaoxiong [7115 0340 7160]
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ORG: Both of the Department of Basic Courses

TITLE: "Pressure Distribution in Dynamically Loaded Bearings with a Partial Circumferential Groove"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 1-8

TEXT OF ENGLISH ABSTRACT: In order to supply oil to the connecting rod bearing, a partial circumferential groove is often adopted in the main bearing of a reciprocating machinery. However, most of the bearing calculation methods do not consider the presence of the circumferential groove. In order that the dynamically loaded bearing calculation may take a step forward in the quantitative direction, the authors have developed a computer program to take the circumferential groove into account and have solved the pressure distribution problem numerically with any desired precision. In addition, the grooves with different dimensions are analyzed and compared. Results of the calculation indicate that the load-carrying capacity with consideration of the groove may be several times less than that without groove consideration and the oil pressure resultant may vary by tens of degrees in direction. The great influence of considering partial circumferential groove on the calculation of dynamically loaded bearings is thus fully demonstrated.

AUTHOR: ZHANG Yanyang [1728 6056 5017]
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ORG: Both of the Department of Basic Courses

TITLE: "The Velocity and Pressure Distributions within the Turbulent Lubrication Film of Slide Bearings"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 9-20

TEXT OF ENGLISH ABSTRACT: With the rapid development of large capacity hydraulic and steam turbogenerators and high speed turbo-machinery, the study of slide bearing working in the turbulent regime has been intensified in recent years. This paper presents the velocity and pressure distributions in the turbulent lubrication film of the slide bearing as obtained by means of numerical method for cases both with and without the inertia effects taken into account.

Where inertia is not considered, the method described in this paper is simpler and gives more accurate results than any other method. Solution of velocity distribution with due consideration of inertia has, so far as the authors know, not been published, the best treatment being obtained under the assumption that the inertia effect does not alter the velocity distribution in the film. The

[Continuation of XI'AN JIAOTONG DAXUE XUEBAO No 5, Oct 81 pp 9-20]

feature of the numerical scheme in this paper is to reduce the high order differential equation to a system of first order equations, to reduce the system of finite difference equations to tridiagonal equations and then use a line-by-line marching scheme. The main advantages of the method is that it is numerically stable, efficient, easy to program and requires small computer storage.

AUTHOR: SUN Guangsan [1327 0342 0005]

ORG: Department of Power Machinery Engineering (II)

TITLE: "The Study of Some Basic Geometric Problems of the Monoscrew Compressors"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 21-32

TEXT OF ENGLISH ABSTRACT: The monoscrew compressor is a new type of compressor with many advantages and broad prospects. This paper presents a systematic analysis of the area of the wheel tooth intervening in the groove, its centroid, the groove volume and shut-off angle. A group of formulas needed in the design of the compressor has been derived and the principles governing the selection of the design parameters, especially of the optimal center distance, are discussed.

AUTHOR: REN Xiaoliang [0117 1321 2733]
WANG Jiansheng [3769 1696 3932]

ORG: REN of Xi'an Jiaotong University; WANG of the East China Institute for Exploration

TITLE: "Overvoltage Protection of Metal-enclosed SF_6 Substations"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 33-42

TEXT OF ENGLISH ABSTRACT: Since gas insulated switchgears (GIS) are the most suitable kind of switchgear for use in circumstances of heavy contamination and insufficient space for installation, a number of 220-500 kv GIS substations are planned to be built in China. In view of this situation, in this paper the authors describe the results of investigations on the lightning protection against incoming surges in those substations. The influences on the protection of the wave steepness and of the important factors related to the protection effect are investigated. All these investigations were made on the data obtained by the Transient Analyzer. The results reported in this paper may prove to be helpful to GIS substation lightning protection designers.

AUTHOR: XIA Daozhi [1115 6670 2972]
G.T. Heydt

ORG: XIA of Xi'an Jiaotong University; Heydt of Purdue University

TITLE: "Harmonic Power Flow Studies. Part I. Formulation and Solution"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 43-56

TEXT OF ENGLISH ABSTRACT: The conventional Newton-Raphson power flow study has been reformulated to permit the inclusion of nonlinear loads. These loads give rise to harmonic signals which propagate throughout the power system. The reformulation is based on the reduction to zero of the mismatch active power and reactive voltamperes, the imbalance current at harmonic frequencies, and the mismatch apparent voltamperes. Conclusions on the existence of positive, negative and zero sequence signals are made for harmonic frequencies. The harmonic power flow study formulation is illustrated for a three phase full wave bridge rectifier.

A companion paper presents a discussion of the actual computer implementation and several practical examples.

AUTHOR: SHEN Zuda [3088 4371 6671]
SUN Bi [1327 1732]

ORG: Both of the Department of Power Machinery Engineering (I)

TITLE: "Theoretical and Experimental Study of the Meridional Flow in a Turbomachine"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 57-66

TEXT OF ENGLISH ABSTRACT: In this paper the meridional flow in a turbomachine is studied. It is found that a change in the path of the steam filaments may greatly affect the stage characteristics. Due to the effects of the tip vortex in the flow passage and some other factors, there is considerable difference between the flow pattern as measured and that obtained on a theoretical basis. It seems most desirable now to intensify the experimental study of three-dimensional flow in turbomachines.

For passages with wider divergence angle, the design method based on the plane cascade data should be changed, and attention must be paid to the effects of the passage profiles and the blade forces in order to improve the turbomachinery design.

AUTHOR: WENG Zemin [5040 3419 3046]

ORG: Department of Power Machinery Engineering (I)

TITLE: "Calculation of the Aerodynamic Performance of an Arbitrary Turbine Cascade Using the Finite Element Method in Semi-geodesic Coordinate"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 67-78

TEXT OF ENGLISH ABSTRACT: Using the finite element method, this paper gives the calculation method of the flow field and energy loss in the subsonic compressible flows through an arbitrary turbine cascade. The approximate treatment of the leading and trailing edge, the methods of density calculation and the criteria for the iteration accuracy are discussed. In the calculation, a local smoothing technique for the velocity distribution with a least square method is used. The results of calculation are compared with experimental values. It is found that the calculation and the experimental values are in good agreement.

AUTHOR: XIAO Yongning [5135 3057 1380]
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ORG: Both of the Department of Power Machinery Engineering (II)

TITLE: "Research on the Theoretical Calculation of the Periodic Instantaneous Temperature Field on the Outermost Metallic Surface of Heated Components of an ICE"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 79-90

TEXT OF ENGLISH ABSTRACT: To study the instantaneous coefficient of heat transfer from gas to wall and the periodic instantaneous temperature fluctuations on the outermost metallic surface which affects the thermal strength of heated components, it is necessary to calculate the periodic instantaneous temperature on the outermost metallic surface under conditions of unstable heat transfer.

The analytic solution an a one-dimensional model can be obtained from the partial differential equation of heat transfer by the superposition method. In addition, a calculation method by the use of FFT is derived. By using these two methods the periodic instantaneous temperatures at different depths of the wall are determined.

[Continuation of XI'AN JIAOTONG DAXUE XUEBAO No 5, Oct 81 pp 79-90]

As for the surface region of a component with an arbitrary shape, presented in this paper is a method that successfully determines the instantaneous temperature field using the finite difference method.

The methods are completely programmed for the components to be calculated on a computer. Actual working with the methods shows that they are quite feasible. The periodic instantaneous temperature fluctuations and additional thermal stress at the surface are quite large, and this phenomenon deserves our attention.

AUTHOR: FENG Jijing [7458 1142 1064]

ORG: Department of Power Machinery Engineering (I)

TITLE: "Theoretical Calculation and Analysis of the Limiting Positions of Supersaturated Steam Flow in a Convergent-divergent Nozzle"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 91-102

TEXT OF ENGLISH ABSTRACT: Based on the definition of Gyarmathy and Meyer for the Wilson point, the author derives a new linear equation for the droplet growth function associated with the problem of condensation of supersaturated steam in a Laval nozzle. The curve determined by the linear equation is a better approximation of the theoretical one than are those of Gyarmathy and Meyer. The author also derives a simplified equation for calculating the Wilson points and provides the computational program for this equation. The theoretical complete Wilson lines for expanding steam in a Laval nozzle with various rates of expansion have been determined. These lines are drawn for a pressure from 0.1 bar to 50 bar. The rate of expansion of nozzles is 10^3 5^{-1}, 3 x 10^3 S^{-1}, 10^4 S^{-1}.

The results of calculation are compared with the experimental data. They agree well in the low pressure ranges, but deviate from each other at high pressure, the reason being that perfect gas law was assumed in the simplified equation.

[Continuation of XI'AN JIAOTONG DAXUE XUEBAO No 5, Oct 81 pp 91-102]

To take account of the effect of time lag on nucleation in the high expansion rate flows, a factor $(1-e^{-t/\tau})$ should be added to the classical nucleation equation. However, with rates of expansion lower than 10^4 S^{-1}, it is quite permissible to neglect the effect of time lag. Therefore, satisfactory results can be obtained for the determination of Wilson lines by using the classical nucleation equation for the rate of production of critical nuclei in expanding steam in a Laval nozzle.

AUTHOR: MA Yichen [7456 6654 1057]

ORG: Department of Mathematics

TITLE: "The Finite Element Interpolational Property in Real Order Sobolev Spaces"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 103-110

TEXT OF ENGLISH ABSTRACT: In 1972 P.G. Ciarlet and P.A. Raviart demonstrated the accuracy of finite element interpolations of functions u in integral order Sobolev spaces $H^m(\Omega)$. Based on the above-mentioned study, this paper proved the accuracy of finite element interpolations of functions u in real order Sobolev spaces $H^s(\Omega)$ (s is real):

$$\| u-\Pi u \|_{s_1,K} \leq Ch_K^{s_2-s_1} \| u \|_{s_2,K}, \text{ where } s_2 \geq s_1.$$

AUTHOR: TANG Quan [3282 3k23]
JI Xing [4472 6821]
YIN Jiaju [3009 1367 7467]

ORG: All of the Department of Engineering Mechanics

TITLE: "Finite Element Analysis of Necking in Circular Cylindrical Bars"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 111-118

TEXT OF ENGLISH ABSTRACT: In this paper a computer program of isoparametric finite elements for large elastic-plastic strain is used to make a comprehensive analysis of the necking of circular cylindrical bars in tension. The shape of the neck, the stress-strain state in the neck, and the $P-\Delta L$ curve are obtained. Such data are useful for the further study of tension tests.

AUTHOR: GU Hongren [7357 1347 0088]
LOU Zhiwen [2869 1807 2429]
CHEN Han [7115 3466]

ORG: All of the Department of Engineering Mechanics

TITLE: "A Solution to the Nonlinear EHL Problem of Two Cylindrical Bodies Including the Visco-pressure Effect"

SOURCE: Xi'an XI'AN JIAOTONG DAXUE XUEBAO [JOURNAL OF XI'AN JIAOTONG UNIVERSITY] in Chinese No 5, Oct 81 pp 119-126

TEXT OF ENGLISH ABSTRACT: The finite element method has been applied successfully to the solution of nonlinear EHL problem with visco-pressure effect. By means of simple iterative and Newton iterative methods, consistent solutions, including secondary pressure peaks and oil film profiles, have been obtained without any pressure distribution assumptions. The application of iterative methods and management of boundary conditions are described. The paper provides an effective technique with high accuracy of convergence and wide applicability for the solution of nonlinear EHL problems.

9717
CSO: 4009/160

AUTHOR: SUN Shu [1327 2873]
CONG Bolin [1783 2672 2651]
LI Jiliang [2621 4949 0081]

ORG: All of the Institute of Geology, Chinese Academy of Sciences, Beijing

TITLE: "Evolution of the Henan-Shanxi Sedimentary Basin of the Middle and Late Proterozoic Age (Part I)"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 4, 1981 pp 314-322

TEXT OF ENGLISH ABSTRACT: A middle-late Proterozoic sedimentary basin of the aulacogen type has recently been recognized in the southern part of the North China Fault Block region (North China Platform).

In both western Henan and southeastern Shanxi north of the Qinling Geosyncline, the middle and upper Proterozoic sequences of thickness more than 7000 m overlie uncomformably the Archean and lower Proterozoic metamorphic basement, and have been classified into the Xionger (ca 1700-1300 m.y.), Ruyang (ca 1300-1050 m.y.) and Luoyu (ca 1050-850 m.y.) Groups and their equivalents. The accumulation of the Xionger Group dominated by volcanic rocks is controlled by the lithospheric and basement faults. The fault-bounded aulacogen opens to and merges into the Qinling Geosyncline in the south and extends NNE-NS toward the interior of the North China Platform.

[Continuation of DIZHI KEXUE No 4, 1981 pp 314-322]

Petrochemical studies show that the volcanic rocks of the Xionger Group are the products of the early stage of rifting, and mainly belong to the shoshonitic series or the alkaline rock series of the Coombs trend and/or straddle trand with a small amount of alkaline rocks of the Kennedy trend defined by Miyashiro (1978).

In the northern slope of the Eastern Qinling Mountains, the Kuanping Group may be the equivalent of the Xionger Group and comprises metamorphosed and strongly folded volcanic rocks. Their petrochemical characteristics show that they belong to the bimodal volcanic rock suite consisting of the basic members of the tholeiitic series and the acid members of calc-alkaline rock series, and that they represent the eruptive products during the initial stage of the oceanic basin evolution.

Based on the above-mentioned studies, the authors come to the conclusion that the genetic relationship between the Xionger Group and the Kuanping Group reveals the early development of a triple junction rift system during the Middle Proterozoic. The continental rift separation along the active arms produced the Qinling geosynclinal trough, which received the Kuanping volcanic suite. At the same time the abandoned arm evolved in the Henan-Shanxi aulacogen with the volcanism dominated by the shoshonitic series. Therefore, the rifting history of the southern margin of the North China Platform is proposed.

AUTHOR: WANG Kaiyi [3769 0418 1837]

ORG: Institute of Geology, Chinese Academy of Sciences, Beijing

TITLE: "Distribution Characteristics of the Rare Earth Elements in Bayanobo Iron Deposit"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 4, 1981 pp 360-367

TEXT OF ENGLISH ABSTRACT: In the REE-iron deposits studied, the ores can be divided into two major types based on the total REE content and chondrite-normalized REE patterns in ores. In the first type the total REE content ranges from 2 to 15 percent and the REE distribution pattern displays a monotonic line dipping toward HREE. In the second type the total REE content falls in a range from 0.5 to 2 percent and the chondrite-normalized REE pattern is represented by a curve with a peak at Pr, suggesting the relative enrichment of Pr, Nd, etc. The difference between two REE distribution patterns of ores can presumably be attributed to the different alkalinity of ore-forming medium. The chondrite-normalized REE patterns do not show the negative anomalies of Eu, suggesting that the ores were formed under oxidation conditions.

9717
CSO: 4009/171

AUTHOR: HUANG Maoxin [7806 5399 2450]
FU Gongqin [1381 0361 0530]

ORG: Both of Chengdu Geological College

TITLE: "The Petrographic Characteristics of the Chayeshan Norite-Gabbro Mass in Shandong Province and Its Prospects for Ore Prospecting"

SOURCE: Beijing DIZHI LUNPING [GEOLOGICAL REVIEW] in Chinese Vol 27 No 6, 1981 pp 505-513

TEXT OF ENGLISH ABSTRACT: The Chayeshan norite-gabbro mass is mainly intruded along a NW-trending fracture zone, which is located between the feldspathic quartz sandstone of the Wennan Subformation of the Mengying Formation (Upper Jurassic) and the pyroxene andesite of the Qingshan Formation (Lower Cretaceous). The intrusive mass occurs as a ring (or tabular) dike, exhibiting high differentiation and weak hydrothermal alteration. The rocks are high in iron content and low in alkalinity. Based on their petrochemical composition, it is inferred that their parent magma belongs to the series of calc-alkali (high alumina) basalts.

From the characteristics of the magmatic rocks, Kohler-Raaz indices and D-value as well as the nickel anomalies found in soil surveys, it can be seen that the internal facies of the intrusive mass displays some features of the formation of copper-nickel deposits. However, due to the low measured value of Co-Cu-Ni-S in the rock

[Continuation of DIZHI LUNPING Vol 27 No 6, 1981 pp 505-513]

mass and the small amount of the volatile constituents in the magma, the authors consider it of little promise to search for copper-nickel sulfide ore-bodies at the level where the rock mass outcrops. Instead, its petrochemical characteristics indicate that the rocks may grade to ferruginous ultrabasic rocks in the deep part of the internal facies of the rock mass. If the S and Cu contents in the rock mass increased markedly and the alternation became intense with depth, then copper-nickel ore-bodies would probably be discovered at depths.

AUTHOR: HUANG Ruihua [7806 3843 5478]

ORG: Changsha Geotectonic Research Institute, Chinese Academy of Sciences

TITLE: "Some Geochemical Features of the Geosynclinal Stages Compared with Those of the Diwa Stage in the Diwa Regions of East China"

SOURCE: Beijing DIZHI LUNPING [GEOLOGICAL REVIEW] in Chinese Vol 17 No 6, 1981 pp 520-527

TEXT OF ENGLISH ABSTRACT: "Diwa" is a specific Chinese tectonic term meaning "geodepression." It was proposed by Professor Chen Guoda [7115 0948 6671] in 1959 as the third main tectonic element of the earth's crust. In the geological literature of other countries the term "activated region" is its synonym.

The geosynclinal stage in the diwa regions of east China has the following geochemical features:
1. At the geosynclinal stage in the area under investigation, basic rocks consist predominantly of magnesium-ultrabasic rocks: the spilitic-keratophyre suites are rich in Na. In the granites, Si, K, Na, Li, Rb, Cs, Be, Nb, Ta, Th, U, Cu, Pb, Zn, W, Sn, Mo, rare earths, etc., are less abundant, while Mg, Fe, Cr, Co, Ni, V, etc., are relatively high. Geochemically, in geosynclinal magmatic rocks Na is richer than K.
2. Spatially, magmatism of the geosynclinal type is characterized by abundant

[Continuation of DIZHI LUNPING Vol 17 No 6, 1981 pp 520-527]

element association of both ultrabasic and basic magmas; in addition, acid magma is also well developed.
3. Temporally, magmatic process of the geosynclinal type is characterized by the prevalence of element association basic-ultrabasic magmas in the early period and by the predominance of element association of acid magma in the late period.
4. As the geosynclinal magmatism exhibits characteristics of the "Pacific rock region," it is reasonable to call this region the "rock region of geosynclinal type" instead.
5. At the geosynclinal stage the metallogenetic process is marked by enrichment of iron group elements (Ru, Rh, Pd, Os, Pt); Mg and Au are also abundant. Judging by the nature of the elements that are abundant and apparently enriched in geosynclinal regions, they consist mostly of metallic elements characterized by a stable atomic nucleus, small atomic volume, great gravity, high fusion point, medium atomic number and medium radius. These elements are of strong metallic properties, siderophile in nature.

Geochemical features of the geosynclinal region differ decidedly from those of the diwa region. This suggests that different geotectonic processes produce different geochemical processes.

9717
CSO: 4009/175

AUTHOR: TAN Weihan [6223 4850 5060]
DING Liming [0002 7787 2494]

ORG: Both of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "Theoretical Analysis of Backward-reflected Laser Light"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 1-7

TEXT OF ENGLISH ABSTRACT: In this paper we present the theoretical analysis of backward-reflected laser light. The subjects involved consist of Doppler frequency shift and broadening, ion Landau damping, Brillouin three wave coupling, Brillouin side scattering and wide spectrum laser heating.

AUTHOR: WANG Zhijiang [3769 0037 3068]
XU Zhizhan [1776 5267 1455]

ORG: Both of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "High Brightness Electron Beam Source and Its Effects"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 8-10

TEXT OF ENGLISH ABSTRACT: We propose the adoption of high temperature laser plasma as an electron beam source. The evaluated results demonstrate that this electron source can be a million-fold brighter than thermal electron guns. The source may be useful for electron microscopy and free electron lasers.

AUTHOR: YAN Haixing [0917 3189 2502]

ORG: Institute of Mechanics, Chinese Academy of Sciences

TITLE: "Vibrational Relaxation Processes in CO_2-N_2-H_2O Laser System"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 11-17

TEXT OF ENGLISH ABSTRACT: A number of important problems concerning relaxation processes of the system are discussed, such as relaxation mechanism of intramolecular V-V processes in CO_2, mechanism of significant effect of H_2O on relaxation, resonant energy transfer between ν_1 and ν_2 modes of CO_2, identity of relaxation data in compression and expansion flows and possible nonequilibrium, among different vibrational levels in a mode and different rotational levels in a vibrational level. Problems that need further exploration are presented. This discussion is also found to be applicable to other laser systems.

AUTHOR: DENG He [6772 0735]
ZHANG Meizhen [1728 2734 3791]
LI Chengfu [2621 2052 1381]

ORG: All of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "Investigation of Laser Beam Induced Birefringence Effect in Glasses"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 18-21

TEXT OF ENGLISH ABSTRACT: Laser beam induced birefringence effects of several types of optical and laser glasses were investigated, and the optical Kerr coefficient n_k and nonlinear refractive coefficient n_2 of these materials at 1.06 μm are given. Analogous measurements at 0.53 μm were also made, and the dispersion effect of these coefficients was found to be distinct.

AUTHOR: WANG Yongjiang [3076 3057 3068]
SUN Wei [1327 1218]
YAO Zhixin [1202 1807 2946]
SHI Baoju [4258 1405 7467]

ORG: All of Zhejiang University

TITLE: "Cu/CuCl Vapor Lasers with Flowing Buffer Gas"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 22-25

TEXT OF ENGLISH ABSTRACT: Some types of copper vapor lasers using copper chloride as a lasant and flowing neon as the buffer gas are reported. Two kinds of high repetition pulsed electric circuits have been used with an energy storage capacitor discharging: (1) directly through a laser tube, (2) through a pulsed transformer for output coupling. The maximum output power of a laser tube of 2.5 cm in diameter and electrode separation of 50 cm is 2.4 W and the peak power 29 KW. The maximum output power of a laser tube of 1.1 cm diameter and electrode separation of 30 cm is 1 W, and the peak power 5 KW, and it operates at an average power of 0.5 W for an accumulative period of about 100 hours.

AUTHOR: TANG Xingli [3282 2502 6849]
ZHAO Meicun [6392 2734 2625]
XU Shizhong [6079 0013 1813]

ORG: All of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "A Flash-pumped Dye Laser in Green-Red Spectral Range"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 26-29

TEXT OF ENGLISH ABSTRACT: In this report we describe our experimental study of a flash-pumped dye laser using four types of dyes: C_{522}, Rh6G, RhB and Rh3B. Its wavelengths range from 5060 ~ 5320 A and 5800 ~ 6470 A. The experimental results are discussed.

AUTHOR: YANG Jingguo [2799 4842 0948]
WANG Heen [3768 0735 1869]
RAN Ruijiang [0373 3843 3068]
et al.

ORG: All of the Department of Physics, Sichuan University

TITLE: "Parametric Up-conversion of 10.6 μm Radiation in Proustite"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 30-33

TEXT OF ENGLISH ABSTRACT: Investigation of up-conversion of 10.6 μm radiation in proustite is reported. Under phase-matched conditions and pumped with a free-running pulsed ruby laser ($\lambda_p = 0.6943$ μm) ($W_p = 0.2$ kW/cm^2), the maximum power conversion efficiency is 1.6×10^{-5}. The optimum phase-matching angle is 26°30' ± 10' and the curves $\eta(Q)$ and $\eta(W_p)$ were measured. The results are discussed.

AUTHOR: LIU Dianyou [0491 3013 0645]
GUO Chu [6753 4342]

ORG: Both of the Institute of Chemistry, Chinese Academy of Sciences

TITLE: "A Novel Method for Manufacturing Blumlein Circuit in Fast Discharge Gas Lasers"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 34-36

TEXT OF ENGLISH ABSTRACT: A novel method for manufacturing Blumlein circuits in fast discharge gas lasers by thermopress-adhesion is described. The laminated flat made by this method is flexible and has fast rise time and high stability in discharge. Thus it is suitable for a fast discharge gas laser with improved output characteristics and can be made portable. Typical output parameters of the N_2 laser with this Blumlein circuit are given.

AUTHOR: XIA Shunbao [1115 7311 1405]
LU Fuyun [0712 4395 0061]
GUAN Xin'an [7070 0207 1344]

ORG: All of the Modern Optics Laboratory, Nankai University

TITLE: "Optimum Electrical Match of an Acousto-optic Mode-locker"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 37-42

TEXT OF ENGLISH ABSTRACT: In the first part of this paper, the design and adjusting method for LC impedance matching network is presented. By this method, the power absorbed by the transducer from an oscillator can exceed 95 percent. In the optimum matching state, the modulation depth of zero order light can be up to 92 percent when LiNbO$_3$-dense flint acousto-optic modulator is driven by 0.5 W RF power.

In the second part an oscillator circuit and its adjusting method are presented. Its frequency is continuously tunable over a range of 54.3 ~ 54.7 MHz and its stability if about $(1 \sim 2) \times 10^{-6}$.

AUTHOR: WANG Mingchang [3769 2494 1603]
WANG Wucheng [3769 2745 2052]
CHEN Xingfeng [7115 2622 7685]

ORG: All of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "Analysis and Measurement of Waveguide Tube Precision of the Waveguide Lasers"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 43-45

TEXT OF ENGLISH ABSTRACT: The waveguide tube is the core of waveguide lasers. Analysis, measurement and inspection of the waveguide tube precision are described in this paper. Requirements for minimizing the waveguide axis bending are given. The relation between the transverse deviation for the axial bending and the curvature radius of the waveguide is derived and the results of the measurement are given.

AUTHOR: ZHOU Zhengwen [0719 2973 2429]
ZHAO Weiming [6392 0251 2494]
CAI Genxing [5591 2704 5281]
LU Qirong [9310 0366 2837]

ORG: All of the Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

TITLE: "A Laser Range-finder with a Ranging Accuracy of ±0.5 m"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 46-48

TEXT OF ENGLISH ABSTRACT: This paper describes a compact pulsed laser range-finder with a ranging accuracy of ±0.5 m and a maximum range of 5000 m. Some factors affecting the ranging accuracy and the methods for improvement are discussed and some measurement data for this range-finder are given.

AUTHOR: XIE Jinshan [6043 6855 1472]

ORG: Wuhan Research Institute of Post and Telecommunications

TITLE: "Optimum Alloying Condition in Ohmic Contact"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 49-51

TEXT OF ENGLISH ABSTRACT: The optimum alloying condition in ohmic contact of GaAlAs/GaAs and InGaAsP/InP semiconductor lasers is described in detail, and a theoretical analysis from the point of view of metallization is given.

AUTHOR: LU Daoping [7120 6670 1627]

ORG: Department of Ophthalmology, Hongguang Hospital, Shanghai

TITLE: "Peripheral Iridectomy by Ruby Laser"

SOURCE: Shanghai JIGUANG [LASER JOURNAL] in Chinese Vol 8 No 11, Nov 81 pp 52-53, 10

TEXT OF ENGLISH ABSTRACT: A technique is described for peripheral iridectomy with a slit-lamp ruby laser system in the treatment of early angle-closure glaucoma. Out of 64 eyes treated by a two-step procedure, 61 were successful. Three eyes received a second treatment one week later by making an opening.

9717
CSO: 4009/169

AUTHOR: TANG Zhongqing [3282 0112 7230]

ORG: China Association of Editors and Reports of Popular Science Journals

TITLE: "China Association of Popular Science Publications, Broadcasting, and Television Programs Editors and Reporters Established in Beijing"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, 11 Oct 81 p 1

ABSTRACT: The National Popular Science Publications, Broadcasting, and Television Society Annual Conference was held in Beijing 6-15 Aug and more than 200 reporters and editors came from everywhere in the country to get together, exchange experiences, and discuss theories and methods of popularizing sciences and technologies. This has been the first such meeting since the liberation. More than 60 papers were received and some of them were of high quality. Delegates agreed that China is a developing socialist country with her sciences and technologies relatively backward. Participants of the conference were reminded of the urgent need of the workers, soldiers, cadres, and youths for scientific and technological knowledge. The society officially established the China Popular Science Publications, Broadcasting, and Television Editors and Reporters Association. Following extensive democratic discussions, the form of secret balloting was adopted by the conference to elect its first 41-member board of directors. A number of prominent scientists of the country were invited to serve as advisors of the association.

AUTHOR: PANG Ruiping [1690 3843 5493]

ORG: None

TITLE: "Introducing the TB4100 Series Power Amplifying Integrated Circuits"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, 11 Oct 81 pp 2-4

ABSTRACT: The TB4100 series integrated circuits are audio frequency OTL power amplifiers produced by Tianjin Semiconductor Devices Plant. The series include the 3 products of TB4100, TB4101, and TB4102 to operate at 6 v, 7.5 v, and 9 v respectively. Their output power varies with load impedance. If 2 chips of identical serial numbers are connected together to form a BTL circuit, the power may be doubled. This is the one great characteristic of the TB4100 series. The other characteristic is their relatively high voltage gain. Generally speaking, when the closed circuit gain is adjusted to 40-50 db, the nonlinear distortion is lower than 1 percent. Moreover, their static electricity consumption is relatively low, only 15mA when the load impedance is 4 Ω. They are, therefore, suitable for use in radios, recorders, and intercoms of the 2-way AC/battery type. The internal circuit and typical applications of this series of integrated circuits are briefly explained.

AUTHOR: RAN Qijun [0373 0366 6874]

ORG: None

TITLE: "The SFW-1 Enhancing Type Silicon Target Dim-light Camera Tube"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, 11 Oct 81 p 14

ABSTRACT: A new device for taking television pictures in dim light, the SFW-1 enchancing type silicon target dim-light camera tube has been successfully made by Chengdu College of Telecommunications Engineering. The S-20 polyalkaline photoelectric cathode is used for the photoelectric conversion component. When high energy photoelectrons bombard the silicon target, a large quantity of secondary current-carrying electrons are produced in the silicon target to realize signal multiplication and to collect and store the enhanced signals in the target. When the scanning electron beam charges the target and read it, the visual frequency signals are the output. When the SFW-1 is coupled with a first-stage image booster, it can take pictures when the surface illumination is below $10^{-5} - 10^{-6}\ l_x$ (the equivalent of the visibility of a cloudy night with no moonlight).

AUTHOR: YIN Renhai [1438 0088 3189]
LAI Hongyuan [6351 3163 3220]

ORG: None

TITLE: "The HZB-1 Ultraviolet Fire Alarm"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, 11 Oct 81 p 14

ABSTRACT: The HZB-1 fire alarm is the product of Sichuan State-operated Changsheng Machinery Plant. An ultraviolet ray sensitive tube forms the major structure. The theory of the alarm is the fact that when the detection [illegible] receives the ultraviolet ray of a wavelength of 2000-2600Å emitted from the [illegible] it will convert the optical signals into electrical signals and send them to [illegible] main machine to be processed and the loudspeaker will sound the alarm. The machine also indicates in a numerical code the area of the fire and can also send a fire alarm to the automatic fire extinguisher equipment. The 7001 ultraviolet ray sensitive tube used in the detection head is produced by Sichuan State-operated Xuguang Electron Tube Plant.

AUTHOR: KE Wei [2688 0251]

ORG: None

TITLE: "3DA200 and 3DA100 Ultrahigh Frequency Intermediate Power Transistors"

SOURCE: Beijing WUXIANDIAN [RADIO] in Chinese No 10, 11 Oct 81 p 14

ABSTRACT: The Department of Radio of Beijing University of Engineering successfully made the 3DA200 series and the 3DA100 series ultrahigh frequency intermediate power transistors to be used mainly in medium band amplifiers of public antenna television system and the Y channel power amplifier of the 200MC band oscillographs. The product has been satisfactorily applied in the public antenna system of Beijing Hotel, China's first public antenna television system. The design of this product has been finalized and the transistors are being manufactured in batches.

6248
CSO: 4009/133

AUTHOR: YU Zhanyou [0205 1455 3731]
LI Changyan [2621 2490 8746]
ZHAO Jujing [6392 5468 7234]

ORG: All of the Scientific Research Institute, Ministry of Railways

TITLE: "The Utilization of Residual Service Life of Car Axles with Minute Cracks"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 1-8

TEXT OF ENGLISH ABSTRACT: Through studies on minute cracks on wheel seats and fatigue tests on model car axles and through investigations on car axles in service, the proposition is presented in this paper that car axles with minute cracks on wheel seats may be further utilized after being provided with stress-relieving grooves to eliminate the cracks. This proposition has been accepted by many car repair shops and is widely adopted in practice.

AUTHOR: LI Ming [2621 2494]

ORG: Scientific Research Institute, Ministry of Railways

TITLE: "Freight Car Impact and Draft Gear"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 9-18

TEXT OF ENGLISH ABSTRACT: Based on the data obtained from the oscillograph records of impact tests on a single and a series of freight cars, this paper analyzes the occurrence and development process of impact force and explains the relationship between the magnitude of the impact force and its rising time and velocity. Theoretical analysis is in conformity with the actual test results. Draft gear can prolong the rising time and decrease the rising velocity of the impact force, thus greatly reducing the longitudinal impact force and providing buffering against impact on the car structure.

This paper describes the results of tests on three types of freight car draft gears usually used in China. Finally the basic relationship between impact force and the characteristics of draft gears is discussed.

AUTHOR: LU Qin [0712 0530]

ORG: Communication and Signals Company, Ministry of Railways

TITLE: "Practical Calculation Methods for Determining Mutual Inductance and Mutual Impedance between the 'Wire-earth' Circuits"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 19-31

TEXT OF ENGLISH ABSTRACT: For engineering design, three kinds of calculation methods are given in this paper:
1. Calculation with Method of Functional Relationship
According to the calculation formulas for mutual inductance recommended by CCITT, an equation containing only one variable x for calculation of mutual inductance is derived through mathematical analysis and a tabular calculation list for mutual inductance and mutual impedance with variable x is made out.
2. Calculation with Nomogram
Based on the nomogram with variable x, one calculation graphic is illustrated in this paper. As compared with the nomogram used previously, this graphic has the characteristics of accuracy and multiplicity in application. In addition to the capability of calculating modules of mutual inductance, the modules and phase angle of mutual impedance at 50 and 800 Hz can be directly found out.

[Continuation of TIEDAO XUEBAO Vol 3 No 3, Sep 81 pp 19-31]

3. Simplified Calculation Method
Applying the approximation theorem, two simplified calculation methods for mutual inductance are proposed. In comparison with the methods introduced abroad, the proposed methods are more applicable to engineering design.

Finally, from the simplified equations for mutual inductance, another simplified calculation equation is derived which is used for calculating the induced effects of electromagnetic interference in the telecommunication line from the AC traction system. The calculation examples computed with the new simplified method show that this new method can reduce the amount of work for calculating the said effects.

AUTHOR: ZHANG Keyu [1728 0344 1342]

ORG: Ministry of Railways Communications Office

TITLE: "Calculation of Longitudinal Voltage Produced in Telecommunication Cable Cores by Induction from Electrified Railway"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 32-40

TEXT OF ENGLISH ABSTRACT: This paper discusses in depth the calculation of longitudinal voltage produced in plastic-insulated and aluminum-sheathed telecommunication cable cores by induction from electrified railway and the effect of screening ground wire on the said voltage.

AUTHOR: QIAN Qingquan [6929 3237 3123]

ORG: Xi'an Jiaotong University

TITLE: "A Study on the Telemechanic Equipment of Traction Power Supply System for Electrified Railway"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 41-47

TEXT OF ENGLISH ABSTRACT: This paper gives a brief account of the basic requirements of telemechanic equipment with regard to the telemechanization technique of traction power supply system for electrified railway and on the coordination between the telemechanic equipment now being developed in China by wiring logic and the computer to better the telemechanic functions. In addition, a study has been conducted on the new computerized telemechanic equipment currently adopted abroad. From the point of reliability technique, the problems that exist in the research are discussed. An outlook on the future development of telemechanization technique is also given.

AUTHOR: XU Kunsheng [1776 0981 3932]
JIANG Zhongyong [5592 1813 3196]

ORG: Both of Beifang Jiaotong University

TITLE: "VHF and UHF Propagation Properties of Railway Mobile Communication"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 48-59

TEXT OF ENGLISH ABSTRACT: Based on the characteristics of railway mobile communication and a large quantity of measured data, this paper obtains propagation curves with regard to the field strength--distance--height of antennas by the mathematical statistics method. Studies are also conducted on the rule of fading of field strength along the railway line. A function of probability distribution of fading is derived and the deviation coefficient and probability coefficient of field strength are obtained. This may prove to be useful in estimating VHF and UHF field strength for railway mobile communication.

AUTHOR: NIE Tao [5119 3447]
LENG Wanhai [0397 8001 3189]

ORG: Both of Beifang Jiaotong University

TITLE: "The Statistical Measurement of Data Signals"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 60-64

TEXT OF ENGLISH ABSTRACT: This paper gives a discussion on the measurement period of a data transmission network. Using the Gaussian channel as a model, the statistical rule of data signal distortion is quantitatively analyzed and the calculation formula as well as results of analyses are given. Then the statistical relation between the number of measured samples, the measurement period and the maximum value of distortion is determined. The paper also presents the 121 type computer program and the results of calculation. These results may provide a theoretical basis for the meaning and application scope of the V.53 Recommendation of the CCITT. They also point out the possibility of shortening the measurement period of the data transmission network.

AUTHOR: HUANG Mingguang [7806 2494 0342]

ORG: Beifang Jiaotong University

TITLE: "Decrease Over Adjustment with Fast and Slow Adjustment of Pilot Frequency"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 65-72

TEXT OF ENGLISH ABSTRACT: This paper discusses the theorem for decreasing the over adjustment of many automatic volume controls of a carrier telephone system with fast and slow adjustment of pilot frequency. By using the residual theory difference equation and others, the transient of potential from the same velocity, different velocity, two kinds of velocity and optimum system (terminal fast adjustment) has been found. Also given are a discussion of the characteristics and a calculation of the optimum system.

A recent experiment has proved the correctness of this paper. It has been adopted for a small coaxial cable of 300 channels to decrease the over adjustment with an optimum system (terminal fast adjustment).

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TITLE: "Train Marshalling Plan Technique by Computer"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 73-86

TEXT OF ENGLISH ABSTRACT: This paper puts forward the idea of arranging train marshalling projects according to the travelling direction. The unfavorable projects are eliminated by analyzing the relationship between the train hour consumption in the project and the number of train travelling directions. With the latter known, the most favorable amalgamation of different train flows from each of the projects left over through elimination is determined with the method of shortest path from graphics. Then, the optimum project is selected after comparison.

In order to meet practical needs, the limitations caused by the existing equipment are taken as the restraining conditions. On this basis, the optimum project is sought out which is practical and has the minimum train hour consumption. The entire procedure is performed by the use of the computer.

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ORG: Scientific Research Institute, Ministry of Railways

TITLE: "A Study on the Compounding of Rail Pads for Concrete Sleepers"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 87-99

TEXT OF ENGLISH ABSTRACT: In this paper, the investigation of the durability of rail pads in the non-elastic fastenings of concrete sleepers is described. It is deemed that further improvement of the specifications and compounding of the ordinary rail pads for the purpose of improving the durability is necessary. According to the improved specifications and compounding, several test rail pads are made of SBR, NR, and BR with various types of curing systems and filler contents as well as coupling agents. Practicality and durability have been verified from the results of several quality tests and field tests.

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TITLE: "Calculation of the Balancing Time of Mechanical Railway Track Scale Lever System and Study of the Error in Its Weighing in Motion"

SOURCE: Beijing TIEDAO XUEBAO [JOURNAL OF THE CHINA RAILWAY SOCIETY] in Chinese Vol 3 No 3, Sep 81 pp 100-110

TEXT OF ENGLISH ABSTRACT: A method to calculate the balancing time of mechanical railway track scale lever system is presented in this paper. The 4090 type dynamic mechanical track scale, mostly used domestically, is taken as an example to analyze the error produced in its weighing in motion through calculation of balancing time. A comparison between the calculation results and those of actual tests shows that the balancing time of the lever system has an extreme effect on the measuring accuracy of the dynamic mechanical track scale.

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CSO: 4009/159

AUTHOR: LU Biao [7120 1753]

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TITLE: "Design of the Shaped Subreflector of Improved Aperture Efficiency Using a Programmable Calculator"

SOURCE: Shanghai DIANXIN KUAIBAO [TELECOMMUNICATIONS INFORMATION] in Chinese No 8, Aug 81 pp 12-15

ABSTRACT: This paper briefly introduces the technique of using a shaped subreflector to improve antenna efficiency. Computation equations suitable for designing it on a programmable calculator are included. With the equations, the subreflector curve of a given parabolic antenna may be obtained and there is no need of carrying out difficult phase measurements of the subreflector scattering field. The mean-square error of the design is less than $\lambda/60$.

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